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COAL

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WITH this number we issue the index to Vol. LI. Every subscriber to the ENGINEERING AND MINNING JOURNAL should receive a copy.

THE work of smelting and refining in bond in this country is taking the place, in a measure, of the business our smelters did when lead ores came in free. The loss of business referred to in the following report from the *Anglo-American*, of Mexico, of June 26th, is only a part of the truth. Every one knows that the "dry ore" miners have been paying for the exclusion of Mexican fluxing ores, and every one knows that the only people who have gained are a few owners of high-grade or "irony" lead ores, and some of the railroads. Our miners are worse off than before.

The heavy shipments of base bullion from the Nuevo Leon smelter to England by way of the Monterey & Gulf road and Tampico is a very interesting event in two aspects. It is the first heavy shipment of any kind over that road to Tampico, and it is the largest consignment of bullion that has gone from Mexico to Europe without going through the United States. The route now opened will furnish a great relief to the smelters at Monterey, as haul to tidewater will be the shortest possible and over a single road. Not only will the freight rates be thus diminished, but the expenses at the border will be entirely obviated.

THE consolidation of most of the important mines and mining companies in the Bingham district, Utah, which was reported during the past week, is an event of considerable importance. These mines have been large and important producers in the past, and from their record during last year and the first half of this give no evidence of being exhausted.

The new consolidation seems likely to have more or less effect upon the smelting industry of Salt Lake as at present conducted. The Niagara Mining and Smelting Company proposes to engage in smelting, we understand, and in acquiring possession of the most important mines of Bingham secures control of the principal supply of lead ore in Utah. Nearly all the ore of that district carries lead, being as a rule of comparatively low grade in silver. The mines of Park City produce very little lead, and although much of the Tintic ore carries a percentage of that necessary element, it is by no means of such desirable character as that of Bingham.

THE CENSUS STATISTICS OF PRECIOUS-METAL MINING.

On another page will be found an abstract of the census statistics of the gold and silver production of the United States in 1889. These statistics have been collected with great care and are believed to be the first correct distribution of the product according to its source.

No precaution which the limited time and appropriation for the work permitted was neglected in order to secure the fullest and most accurate returns possible for this important industry. Absolute accuracy was unattainable for reasons referred to in the report, but it is believed that the statistics given in this report are correct within the limits of reasonable accuracy, and that the distribution of the product among the States and Territories is very much more reliable than any statement heretofore made on this subject.

An idea of the extent of this investigation and of the results obtained by correspondence may be formed from the following facts.

The number of gold and silver mining "claims" or "locations" which are commonly called "mines" in the United States is almost beyond computation. Probably the names of nearly 100,000 of such claims or mines were received by the special agent; but upon limiting the investigation to 1. Producing mines; 2. Mines working but not producing; 3. Mines temporarily stopped, but which formerly produced or upon which the work done had established their value, and which could properly be classed as mines, the list declined to perhaps 10,000, and upon tabulating only such mines as made returns of production or labor statistics, the list shrunk to 6,004, which is still, however, a larger number than the aggregate of all other mineral-producing mines in the United States. Of these final reports 43 per cent. in number were reported direct through correspondence and the balance were collected through sub-agents in the field. It is confidently believed that with time and continuous efforts the reports of probably 80 per cent. of all the producing mines could be secured by correspondence—this, however, would still leave the necessity for employing agents in the field to collect the remaining 20 per cent.

THE FLOODING OF THE COLORADO DESERT.

The curious phenomenon of the flooding of the Colorado desert in San Diego County, Cal., which we described in our issue of July 4th, continues to excite interest. The water is still rising in the Salton Sink, although now very slowly.

One of the parties sent out to determine the source whence the water was running into the valley, reported that a stream of considerable size had broken through from the New River, at a point some distance south of Salton, and was pouring into the desert. This effectually disposed of the wild and ridiculous theories which have been published in the newspapers concerning subterranean connections with the Great Salt Lake of Utah, and the Gulf of California. The explanation of Major POWELL, of the Geological Survey, in respect to the origin of this remarkable valley in Southern California, is, of course, the only logical one, and is undoubtedly correct. Nor has there been from the first any reasonable doubt concerning the source of the water which was flooding it. As the water in the river, which has been unusually high during the past month, falls, the flow into the valley will probably soon cease, and the lake will rapidly dry up, unless, as recent dispatches state, the river has actually cut a permanent channel into the desert.

The occurrence of this flood recalls the schemes which were first suggested more than 50 years ago for doing artificially that which has recently been in part accomplished by nature. It would not be a difficult task to turn the water of the Gulf of California into this basin, and thereby make a lagoon covering about 3,000 square miles. The scheme was first proposed by Gen. Fremont, we believe, as early as 1847, while many other engineers since then have repeated the suggestion. The scheme was at one time reported upon favorably by a Congressional committee, and the matter was then dropped; it was revived in 1873, however, by Senator Jones, and an extensive survey was made, but nothing came of this investigation.

That the flooding of this desert would have a beneficial effect upon the climate of the surrounding country there is little doubt. At the present time this region, including the valley itself and the slopes of the San Bernardino and San Jacinto ranges of mountains, are as arid and barren a waste of land as there is in the United States. The sun pours into this valley with fierce intensity, and the heat during the summer is extreme. The hot air which rises from this extensive area undoubtedly has considerable effect upon the climate of those parts of Southern California within a certain radius, and if the desert were flooded it is not unlikely

that its cooling influence might induce greater rain fall in the immediately adjacent country, the soil of which is said to be fertile but unproductive from lack of water.

THE FOUNDATIONS OF THE FREE-COINAGE ARGUMENTS.

Senator STEWART, of Nevada, in the extracts from his letter addressed to Mr. CARNEGIE and published on another page, makes several erroneous statements of facts, as the foundations for his argument in favor of the free coinage of silver, and as the argument fails when its foundations are removed, we devote much space to the subject; for many honest and disinterested advocates of free coinage have accepted these misstatements as the truth without thought or investigation, and have based their opinions upon them.

In order to facilitate reference to some of the points in Senator STEWART'S reply to Mr. CARNEGIE, we have numbered the paragraphs and refer to them by number, as follows:

1. Senator STEWART does not know, nor does any one else know, what the indebtedness of "the people of the civilized world" was in 1873 or at any other time, nor that this indebtedness was payable "in either gold or silver." At that time many countries, like India, Mexico, etc., etc., were and still are on the silver basis, and no doubt, when the contract did not specifically call for gold, debts were payable in the currency of the country. Here to-day a gold debt can be paid in paper because gold can be obtained for the paper. The moment one kind of money becomes depreciated as compared with another, every one prefers the better money, and, if his contract permits, will demand it.

2. Senator STEWART admits that value depends on supply and demand. The world's supply or production of gold and silver has been as follows:

In 1850	1 gold	to	16	silver
In 1860	1 "	"	5·47	"
In 1870	1 "	"	5·79	"
In 1880	1 "	"	14·2	"
In 1889	1 "	"	21·92	"

The consumption or demand (mostly for coinage) for the metals absorbed all that was produced, though the superabundance of silver caused the price to decline, in accordance with the law Senator STEWART recognizes, until it reached a figure about on a parity with production—that is, about 1 gold to 22 or 23 silver in value as in weight. This is both a natural and a true explanation of the change in the relative values of the metals.

The decline commenced before 1873, and it grows just about in proportion to the excess in production of silver over gold.

3. Senator STEWART says that "the demand for gold for non-monetary purposes is rapidly increasing and consumes nearly, if not quite, all the annual supply from the mines." Statistics quoted in these pages last week show, on the contrary, that the coinage (and recoinage of old coins) consumes each year more than the entire production of gold. The Director of the Mint finds that in 1889 about 30 per cent. of our domestic production of gold is used in the arts. But it should be remembered that a very large part of the gold used in the arts finally comes back to the Mint and is coined or resold for use in the arts. Senator STEWART'S figures are therefore wholly erroneous in this as in other statements. The statistics collected by the British Royal Commission of 1887, appointed to inquire into the relative values of the precious metals, show that the world's stock of gold money is increasing rapidly, proving, in fact, that most of the gold production is added yearly to the stock of money. The Director of the U. S. Mint has demonstrated the same fact, Senator STEWART to the contrary notwithstanding.

4. Senator STEWART says that "the value of silver as compared with commodities is now as great as in 1873," and he again admits that "the value of silver is no more exempt from the law of supply and demand than that of gold." Does Senator STEWART think that gold would have held its value at 16 times that of silver if the gold production had quadrupled and that of silver had declined or remained stationary?

Gold was actually declining in value relatively to silver on the basis of 16 to 1 or 15½ to 1 from 1850 to 1870, owing to the heavy production of the metal in California and Australia, and had that abnormal production continued no doubt the coining ratio between the metals would have required readjustment. So it is with silver to-day; the output is so great, and is increasing and will continue to increase so much more rapidly than that of gold, that unless *all* the commercial nations unite in making a greater market for it by agreeing to accept it at the present ratio, its value must inevitably decline. For us to sacrifice every interest in this country in a vain effort to reverse alone this law of supply and demand is simply folly on our part.

Contrary to Senator STEWART'S statement, silver *has* declined in value as compared with some commodities, and increased in value as compared with others, though nearly all commodities have declined very rapidly in recent years owing to overproduction caused by improved methods of production. It would be just as reasonable to expect the price of steel rails to remain as they were 15 years ago as to expect the value of silver to remain stationary.

We shall next week publish a diagram showing the fluctuations in the prices of commodities and of silver for a number of years.

5. The statistics of the world's production of silver and gold, which we have published and will repeat in another issue, flatly contradict Senator STEWART'S statement that "there has been no inequality in the production of gold and silver which could have affected their relative value."

We thus correct the fundamental statements of the free-coinage advocates, of whom Senator STEWART appears to be the chief mouthpiece, and we show by the statistics of production and coinage of the precious metals that these statements are wholly erroneous. They are repeated by most of the free-coinage advocates without ever ascertaining whether they are true or false, and the opponents of free coinage, for the most part very busy men, do not take the time necessary to investigate the subject, and, consequently, overlook the fact that the free-coinage arguments are absolutely without foundation in their most essential points.

The several reports of the Director of the United States Mint, the report of the British Commission on the recent changes in the relative values of the precious metals, and the report of EDWARD ATKINSON on Bimetallism, without citing other works, furnish full data on these subjects, and render the wild, unfounded statements of Senator STEWART and others wholly inexcusable.

The so-called "Executive Committee of the National Silver Organization," composed chiefly of silver producers, several being connected with the Comstock mill, of which Senator JONES, of Nevada, is president, recently issued a manifesto which is evidently in the language of Senator STEWART, and contains the several misstatements which we have analyzed above. Thus, it says, "for eighteen years gold production has been falling off," while we have shown that, on the contrary, it has been increasing. It says there is not gold enough to maintain the business and credit of the commercial world, but we have shown (ENGINEERING AND MINING JOURNAL, July 11th) that the commercial world is coining nearly as much silver as gold, and is coining more than 80 per cent. of all the silver produced in the world.

It is assumed that, if this country adopted free coinage of silver, gold and silver would keep afloat together on the ratio of 16 silver to 1 gold, though we see every day that in India, Mexico, most of South America and other states which have the free coinage of silver, gold never circulates, but silver is at a discount corresponding to the market price of bullion. Now, assuming that the great European nations refuse to enact free coinage of silver or even to adopt the bimetallic standard, what reason have the advocates for free coinage of silver to think that if we adopted it silver bullion would advance all the world over, or that our silver dollar would then buy a gold dollar all the world over; on the other hand, if silver declined below $1.29 in gold per ounce abroad what would prevent its declining to the same degree here?

The free-coinage advocates constantly end with the threat that, "if the silver of the world and all that can be produced cannot be restored to its place as money to supplement gold, bankruptcy and ruin are inevitable, unless some other kind of money can be devised to take the place of both. Let the Ohio Convention, representing the Gold Trust, take warning that if silver cannot be remonetized, gold will be demonetized and paper substituted for both gold and silver."

In other words, all they want is cheap money—the cheaper the money the better; and on that basis it is folly to "demand" silver. Better at once "demand" fiat paper, which is cheaper yet, and can be produced in unlimited quantity. The example of the value of our own greenbacks when it took $2 of them to buy $1 of gold or silver, or the example of the Confederate paper money, of which $100 would not buy $1 of silver or gold should show people the final outcome of this cheap money craze. What is wanted by every honest man, and especially by every honest poor man, is a money that is good the world over. By all means let us have both silver as well as gold just as quickly as we can get other nations to agree on a value ratio between gold and silver at which either metal will be received. Every step we take toward free coinage of silver, however, simply retards the co-operation of other nations in adopting a ratio at which they will take silver or gold as offered.

BOOKS RECEIVED.

[In sending books for notice, will publishers, for their own sake and that of book buyers, give the retail price.—These notices do not supersede review in another page of the Journal.]

Aide-Mémoire du Chimiste. By Raoul Jagnaux, Directeur du laboratoire Hautefeuille. Illustrated, 985 pages. Published by Librairie Polytechnique Baudry et Cie. Paris, 1890. Price, frcs. 15.

A Treatise on the Calkins Steam-Engine Indicator; with Descriptions of Calkins' Improved Graduated Pantograph, Polar Planimeter, Speed Measure, Revolution Counter, Parallel Rule, Indicator Spring Weighing Device, Mercurial Column. Illustrated, 114 pages. Published by The Engineers' Instrument Co., New York, 1891. Price $1.50.

Reports of the Inspector of Mines and Deputy Inspectors of Mines for the year ending November 30th, 1890. By G. C. Swallow, Inspector, and J. B. Trevarthen and Jacob Oliver, Deputy Inspectors. 21 pages. Helena, Montana, 1891.

CORRESPONDENCE.

We invite correspondence upon matters of interest to the industries of mining and metallurgy. Communications should invariably be accompanied with the name and address of the writer. Initials only will be published when so requested.
All letters should be addressed to the MANAGING EDITOR.
We do not hold ourselves responsible for the opinions expressed by correspondents.

Wanted, An Antidote to Acid in Boiler Feed Water.

EDITOR ENGINEERING AND MINING JOURNAL:

SIR: We want to use the water from our mines in the boilers. It is impregnated with sulphur, iron, and copper, consequently is destructive to the iron. What is the best method in practice for purifying? Shall be pleased to hear from any authority on this point.

RICHARD EAMES, JR., Mgr. New Gold Hill Co., Ltd.

GOLD HILL, North Carolina, June 22, 1891.

Bunker Hill & Sullivan Mining and Concentrating Company.

EDITOR ENGINEERING AND MINING JOURNAL:

SIR: I have just noticed in your issue of the 27th ult. a paragraph referring to a decision by Judge Sawyer which might be interpreted as damaging to the Bunker Hill & Sullivan Mining and Concentrating Company, of Wardner, Idaho. In substance this article is similar to many so diligently circulated of late in Western papers. As the source, motives, and purposes of this circulation are so transparent to those near home, notice of it was superfluous, but for information to distant interested persons I beg leave to publish the facts.

Judge Sawyer decided a question of jurisdiction only; in other words, in what court a certain case should be tried. The scope of this decision in no manner whatever damages or jeopardizes any part of the Bunker Hill & Sullivan Mining and Concentrating Company's property. It does not decide any suit, nor does it reverse any judgment. Judge Sawyer simply decides that the "Small Hopes Fraction" is a case proper for the United States Court. This fraction covers an area of little over one-quarter of an acre; it is adjacent to the Sullivan claim, and is owned by our company. It is of surface value only, and contains no part of the apex of the Sullivan lode. This decision by Judge Sawyer does not affect the Mammoth-Lackawanna case, which was tried last year, and an unanimous verdict found in favor of the Lackawanna claim, in which we are interested. The ground involved in this controversy is also adjacent to the Sullivan and contains no part of the apex of that lode. The "Small Hopes Fraction" is now being litigated by the Mammoth title already decreed null and void by the verdict above mentioned.

To the readers of the ENGINEERING AND MINING JOURNAL interested in the affairs of the Bunker Hill & Sullivan Mining and Concentrating Company I will state that the property is in full operation. It produced during the month of June concentrates containing 51,000 ozs. silver, and 1,200 tons lead. The product is shipped to the Globe Smelting and Refining Company at Denver, Colo., and to the Colorado Smelting Company at Pueblo, Colo. The jigging capacity of the dressing works is being increased to treat 30% more material.

The erection this fall of an additional plant for treating low-grade ores is contemplated. When completed the works will treat from 750 to 800 tons of ore per day and give employment to 500 or 600 men.

PORTLAND, Ore., July 5, 1891. V. M. CLEMENT, Manager.

The Gold Ores of the Transvaal.

EDITOR ENGINEERING AND MINING JOURNAL:

SIR: Your correspondent H., of Johannesberg, in your issue of June 27th, in a very interesting and instructive letter, makes what seems a strange statement. Touching upon the unsatisfactory results obtained from working the Transvaal ores, he says: "Fine mechanical grinding and subsequent amalgamation is a better method by far, but it will be understood that it is slow, and *will pay individuals better than large concerns.*"

It is generally considered that to work ores cheaply they should be worked on a large scale. Knowing, as I do, that there are many in the Transvaal who have had more or less experience with pan-amalgamation, it is with some diffidence that I suggest at this distance a thorough trial of that treatment on those ores. But the testimony of your correspondent corroborates what I have been told by others, and in the absence of proof to the contrary I incline to the belief that the proper treatment for those ores is pan-amalgamation in conjunction with concentration. So much attention has of late been given to recent processes that perhaps the fact may have escaped some that pan-amalgamation still exists, and in its field is still king. True, its field is not so broad as it was, but there are yet some ores successfully treated by it that could not be treated by any other known method.

The cost of panning those ores should not be excessive. Being gold the cost of chemicals, as well as of quicksilver, would be light. It is pertinent and applicable to quote from an editorial in the ENGINEERING AND MINING JOURNAL of October 6th, 1888, under the head of "Economical Mining and Milling." . . . "At the Gloster mine, Montana, where supplies are dear, with 60 stamps of 850 pounds, there were milled and amalgamated by the Boss continuous process in six months 26,201 tons of ore at a cost of $1.99 per ton. There were 169 days working time, giving an average of 144 tons per 24 hours, and the expenditures were as follows: Quicksilver, $4,955; wood, $8,274; salt, $3,222; shoes and dies, $6,480, the balance being made up of labor and management. Subsequently, in one month, at the same mill, the average number of tons put through amounted to 191 tons in 24 hours, and the cost was reduced to $1.20 per ton." It is not to be expected that the ores at the Transvaal could be worked quite so cheaply as this, but if it will take out the gold, there is a broad margin for profit in panning them.

SAN FRANCISCO, July 9, 1891. M. P. BOSS.

The Free-Coinage Question.

EDITOR ENGINEERING AND MINING JOURNAL:

SIR: Since you have invited through your valuable columns a candid discussion of the silver question, I beg leave to ask for a limited space.

In order to intelligently discuss this vital question that now commands almost universal attention, it becomes absolutely necessary to know what *true* money is. By true money I desire to be understood as speaking of a money having in and of itself the intrinsic value its stamp bears. One of the duties devolving upon every government is to furnish for its people some medium of exchange or some kind of money. The government should furnish a reliable money—one that will in and of itself be of fixed value, or as nearly so as possible. The history of the past teaches us that any money other than gold and silver, or paper convertible into gold or silver at the wish of the holder, brings with it sooner or later trouble.

The past teaches us that of the two true precious metals, gold and silver, the Supreme Architect of the universe placed in the earth about 16 times as much silver as he did gold. To-day in the civilized world there is $3,700,000,000 in gold and $3,800,000,000 in silver, or about 16 times as much silver as gold. Hence we put 371¼ grains of silver in a mold and stamp it the unit of value, viz., one dollar. We put 23·22 grains of gold in a mold and stamp it the unit of value, viz., one dollar. The laws of supply and demand regulate the prices of all commodities. Gold and silver in bullion are only commodities, subject to the unerring results of the laws of supply and demand. Stop the demand for one and you decrease the value; increase the demand for the other and you increase its value. When the world became alarmed at the enormous output of gold when the California and Australian fields were fairly opened, many nations ceased to coin gold, and silver increased in value until, according to the unit of value, 371¼ grains of silver in 1873 were worth in the markets of the world 104 cents in gold. Then, the supply of gold having largely decreased, they ceased to coin silver, and silver began to decrease in value. So long as they both went to the mints of the world free and unlimited to be coined, their values were uniform upon the basis of 16 parts of one equal to one part of the other.

The great demand for gold and silver comes from their value as money mediums, and upon this demand depends their value. I believe the greatest menace to our prosperity to be an insufficient volume of money, with which to measure our almost boundless products. As proof of this I will state that the periods of our prosperity are limited to a single year, due to the fact that, as soon as our business increases above a certain point, money is so scarce that failures follow from inability to get money and stagnation and depression take the place of prosperity. Still another proof of the insufficiency of our circulating medium is the fact that there is due depositors in the United States $2,800,000,000 more money than our entire available circulating medium, and $2,100,000,000 more than the entire circulating medium. And still another: The total value of the wealth of the United States is $63,000,000,000. Each year adds 4 per cent. to this, or $2,512,000,000. Seven per cent. of all transactions, of necessity, are in cash, and 7 per cent. of $2,512,000,000 is $175,000,000, which is the amount needed to be furnished to measure the increase of wealth each year. This has not been done for 25 years, or near it; hence money is gradually growing more scarce.

The world's product of silver for 1890 was about $133,000,000.* The mints of the world outside of the United States, and the arts and sciences, consumed $85,000,000 of this; we produce or coin about $30,000,000 per annum in gold. These being facts that all informed men know to be true, why cannot we with safety coin this balance of $48,000,000 per annum?

If the surplus were all coined the inevitable result would be a complete restoration of the commercial value of silver to $1.29 per ounce, for there would be no need of disposing of it for less price. The idea that we would at once become the dumping-ground of the world for silver seems thus to be an idea entirely without foundation, for this reason: The silver already coined would not make a dollar if recoined here, because we coin upon the basis of 15·98 parts silver to 1 of gold, and they at 15·50 parts of silver to 1 of gold. The money in silver represents the same unit of value there that it does here; so it could not come here. The holders of silver abroad have disposed of something for each piece of silver they possess upon the basis of its value, and would not part with it upon any other basis; and so far as the silver which has been used in the arts and sciences, the labor bestowed upon it has so increased its value that it cannot come, and the surplus of bullion is so small that it would be a blessing rather than curse should it all come.

For the above reasons I favor the free and unlimited coinage of silver, to the end that the dollars of our fathers may be restored to their true value, never to again be demonetized by unwise legislation.

ISHPEMING, Mich., July 8, 1891. J. MAURICE FINN.

[Mr. Finn has, as far as we are aware, no means of knowing whether the earth contains only 16 times as much silver as gold; on the contrary, all our knowledge on this subject leads us to believe it contains a very much larger proportion of silver; and in the United States we are now actually producing about 33 times as much silver as gold by weight. The correct figures were published in these columns on July 11th.

Mr. Finn frankly admits that actual, intrinsic value is the only basis on which coinage should be made; and he says, what probably every one will agree to, that if the whole world adopted free coinage on the basis of 16 to 1, silver and gold would circulate at this ratio.

But he does not give any reason for his belief that the two metals would keep afloat together here at our ratio. If we adopted free coinage on the basis of 16 to 1, and all other countries declined to do so, but continued to treat silver as a commodity, worth about one-twenty-second of gold, probably Mr. Finn will admit that, if the entire world produced 32 times as much silver as gold, as the United States is doing, or 50 times as much, as seems quite within the range of possibility in the near future, it would be difficult to keep the metals afloat on a ratio of 16 to 1. Yet, if all nations agreed to take the metals at this ratio this could be done, for a time at least. Since, however, in all other nations about 22 ounces of silver will now buy only 1 ounce of gold, it is evident that if 16 of silver would buy 1 of gold here, it would not take long before the silver bullion of the world would come here. And how long would it take our gold to disappear when a gold dollar could not be obtained for a silver dollar? How long did it take both gold and silver to disappear when our paper greenbacks were not worth par in gold or silver?

The first step seems to us to be to obtain an international agreement upon a ratio of gold to silver at which the chief commercial nations will take these metals indifferently. Then, and not until then, would it be safe for us to adopt free coinage of silver.

Mr. Finn's statistics of production and uses of the metals are incorrect; he evidently has taken them from some erroneous source.—ED. E. & M. J.]

*There have not been any figures yet published for the whole product of silver in 1890, but it will certainly exceed $175,000,000.—EDITOR ENGINEERING AND MINING JOURNAL.

AN APPARATUS FOR ESTIMATING CARBON IN IRON AND STEEL.

Written for the Engineering and Mining Journal by G. Lunge, Ph. D., Professor of Technological Chemistry, Polytechnic School, Zuerich.

A few years ago a Swedish metallurgist, Wiborgh, published a process for estimating carbon in iron and steel which has excited a great deal of attention and has found extensive application, owing to the comparatively short time in which tests can be performed by it. Wiborgh's very imperfect apparatus has been considerably improved by von Reis and by Thörner, and one or the other of these apparatuses is now met with in many European metallurgical laboratories.

The first part of Wiborgh's process is identical with that now almost universally employed, viz.: treating the sample with a solution of a cupric salt and burning the carbon thus separated by means of chromic acid. Usually the carbonic acid thus generated is estimated gravimetrically, by absorption in caustic potash, soda-lime, or the like. This involves the use of a complicated apparatus, comprising many tubes temporarily joined together, and a considerable number of weighings. It is decidedly difficult for beginners to obtain anything like satisfactory results by that method; and Professor John W. Langley, in his paper read at the Pittsburg International Meeting in October, 1890, has proved that, as carried out hitherto, that method contains unsuspected sources of error. Even with his improvements, assuming them to have removed those sources of error, the gravimetric method is a decidedly tedious process and is always uncertain except in very experienced hands.

It is almost unnecessary to say that the foregoing remarks apply even more strongly to the "dry combustion process," with which we shall not concern ourselves at all.

WIBORGH'S PROCESS.

Wiborgh's innovation consists in *measuring*, in lieu of *weighing*, the carbonic acid. He expels it by boiling, carries the gas, mixed as it is with the air previously present in the apparatus, into a measuring tube (a "gas-burette"), observes its volume, introduces a solution of caustic potash into the tube, and again observes the volume; the difference between the two readings indicates the quantity of carbon dioxide, which must be corrected for temperature and barometric pressure, and reduced to the corresponding weight of carbon. This process permits very rapid work, but Wiborgh's apparatus cannot furnish any really trustworthy results, and if his comparative analyses as quoted by him show a very satisfactory agreement between his volumetric and gravimetric determinations it must be said that this is owing to a fortuitous compensation of different errors, occurring in opposite directions, which cannot, of course, be relied upon in all cases.

The following imperfections exist in Wiborgh's apparatus: The flask in which the combustion process is carried on is closed with an india-rubber stopper, which is sure to come now and then into contact with the boiling chromic-acid mixture, and thus to increase the quantity of carbonic acid. On the other hand, it is impossible to expel all the carbonic acid from the mixture by working according to Wiborgh's prescription. Mere boiling will not expel all the gas, and some of it will even be re-absorbed during the partial cooling which is to take place before transferring the gas to the measuring tube. Since the latter is trapped with water, this must absorb a considerable quantity of carbonic acid. Wiborgh certainly has not overlooked the last-mentioned fact, but his way of correcting it is altogether inadmissible. He estimates the absorption of CO_2 by water for a temperature of 18° C., and introduces a factor based thereupon. But this factor would have to differ with any deviations of temperature, of barometric pressure, and of the ratio between carbonic acid and air. A neglect of this fact must cause errors far too serious even for ordinary technical purposes, and puts it out of the question to employ that method for any accurate work. Lastly, the necessity of thoroughly cleaning the measuring tube from the caustic solution causes much loss of time, and may again cause the most serious errors, especially if that part of the work is left to the ordinary "bottle-washer." Altogether, Wiborgh's apparatus must be pronounced to be far too imperfect; and while we are grateful to him for his suggestion to substitute volumetric for gravimetric analysis (which the present writer had privately made before him, and which no doubt others have made as well), we must distinctly dissuade chemists from using his apparatus.

IMPROVEMENTS OF VON REIS AND THÖRNER.

A. M. von Reis has greatly improved Wiborgh's apparatus. He employs mercury in the gas-burette in lieu of water, and he effects the absorption of the carbon dioxide in a separate "Orsat tube," thus avoiding the soiling of the gas-burette with caustic liquor. He furnishes the boiling-flask with a glass worm for condensing the steam, but retains the india-rubber stopper, and takes no precaution for expelling the carbonic acid otherwise than by boiling. His results will no doubt be better than Wiborgh's, but certainly not yet sufficiently accurate.

Thörner (*Zeitschrift für angewandte Chemie*, 1889, p. 644) again improved the apparatus by doing away with the india-rubber stopper and employing a ground glass pin (as Wedding had previously done in his gravimetric apparatus). He also gave very good prescriptions for the preparation of the necessary reagents, and an elaborate table for reducing the volumes of CO_2 to the "normal conditions" of 0°C., and a pressure of 760 m. m., extending the calculation to the weight of carbon.

Thörner, although he admits that mercury is the theoretically best trapping liquid, unfortunately prefers for practical work simply water or else a saturated solution of sodium chloride or sulphate, which liquids are to be shaken with air containing a considerable quantity of carbonic acid. This procedure is stated to yield "very satisfactory" results. But I must declare that it involves gross errors; for a trapping liquid treated as above will in many cases yield carbonic acid to the gases contained in the burette.

It is true that this error will be partially compensated by the incomplete expulsion of carbonic acid from the boiling-flask; probably the "satisfactory" results mentioned by Thörner are to be explained in this way. But a fortuitous and partial compensation of errors is certainly very far removed from the idea of a perfect process.

Every apparatus hitherto devised for the volumetric estimation of CO_2 involves observations of the thermometer and barometer for each test, and reduction of the volume of the gas to "normal conditions," that is to 0°C., a pressure of 760 m. m. and the dry state.

THE LUNGE-MARCHLEWSKI PROCESS.

I have, with the co-operation of Mr. Leo Marchlewski, endeavored to work out a more perfect apparatus and process for the volumetric estimation of carbon than those of my predecessors. To this end we had only to adopt a process for the estimation of carbonic acid, previously worked out and published by us in the *Zeischrift für angewandte Chemie*, 1891, p. 229. Our process avoids all the sources of error mentioned in describing the apparatus of our predecessors. The chromic acid solution does not come into contact with india-rubber or other organic substances. The carbonic acid is expelled from the liquid with absolute completeness, and is stored and measured over mercury. The gases are measured under such conditions that their volume is at once reduced to the "normal state," hence the observations of a thermometer and barometer, and the calculations connected therewith, are quite unnecessary. I believe that the process to be described now is free from all known sources of error, and that it yields the best determinations of carbon in iron and steel, of any now in existence, with no greater expenditure of time, trouble, and skill than any other. It combines all the advantages of the gravimetric and volumetric processes, and is equally applicable to the most accurate fundamental investigations and to the daily routine of metallurgical laboratories.

The principle of our process is as follows: The iron is treated in the usual manner with a solution of copper salt, in order to separate the carbon. I shall not enter upon a discussion of the merits of various modifications adopted for this end, as the manner of separating the carbon forms no distinctive feature of the new process, which extends only to the estimation of CO , simply saying that the best known or hereafter to be worked out process for separating the carbon should be employed. I myself prefer a saturated solution of cupric sulphate, which seems to serve the purpose perfectly well if applied in the proper manner, and if checked for any impurities by a blank experiment. The precipitated carbon need not be filtered on asbestos or the like, but it may be burned within the liquid by a mixture of chromic and sulphuric acid, as is well known. The best proportions of mixtures to be employed for that purpose, which partly deviate from those hitherto used, had to be found out by practical testings, as will be stated below. The carbonic acid evolved in this process is estimated, as first proposed by Wiborgh, in the state of gas. But in lieu of expelling it from the liquid by mere boiling, which is always an incomplete process, and in the case of iron containing but little carbon, may produce serious errors, whether the CO_2 is estimated by weight or by volume, we cause its complete expulsion in the first instance by strongly rarifying the air, and ultimately by generating another gas (oxygen) within the liquid itself. The trapping liquid in our gas-burette is mercury. This is indispensable in order to enable us to work with a vacuum, but it also eliminates the possibility of absorption of carbonic acid in the trapping liquid, and the most objectionable "corrections" introduced by our predecessors on this account. This is an imperative requisite for anything like correct work. Our apparatus is so constructed that any contamination with organic substances is excluded. We might stop there and measure our gas as usual, reducing the volume to the "normal state" by readings of the thermometer and barometer, and in this case the apparatus is no more complicated than those previously described by others. I prefer, however, to apply the principle of the "gas volumeter" which I invented last year (compare *Berichte der Deutschen Chemischen Gesellschaft*, Vol. XXII., p. 440, and *Zeitschrift für angewandte Chemie*, 1890, p. 139, and 1891, p. 197), by which all observations and calculations connected with the reduction to the "normal state" are done away with. This makes the apparatus a little more complicated, but even so it is extremely easy to handle and no barometer is required at all. We shall see that we can even proceed in such manner that the percentage of carbon is read off directly to 0.001%, without any calculation.

THE APPARATUS.

Our apparatus is shown in the accompanying diagram, which is one-sixth of the actual size. *A* is a flask holding about 200 c. c., including the cylindrical portion. A lateral tube sealed in the glass ends inside in an open point *b*; on the outside it continues into a glass-tap *a* and a large cylindrical funnel *t*. The neck of *A* is closed by a ground-in glass stopper *c*, open at the bottom and continued upward into a Liebig's cooler *d*, altogether made of glass; the upper end of *d* is connected by means of a ground-on cap *e* with the bent capillary tube *f*, 1.5 mm. wide and 36 cm. long. It is not indispensable to make the joint at *e* by means of a ground-on glass cap, as here shown; if the capillary tube *f* should be broken, it may be replaced by a plain thermometer tube bent at a right angle and connected with the upper end of the cooler *d* by means of an india-rubber tube. This can be done, because this joint is never touched by hot chromic acid solution, and comes into contact with that solution only for a few seconds at the end of the operation and after being cooled down in *d*. Still I prefer providing new apparatus with the ground-glass joint at *d*.

It is imperative that all joints should close air-tight without any grease, vaseline or the like, simply by moistening with water. Formerly only few workers in glass were able to fulfill that condition; but nowadays any first-class German dealer in apparatus does so without any difficulty. The various instruments used in the course of my investigations never gave me any trouble whatever in that respect. The introduction of a source of error through the contact of chromic acid solution with organic substances is thus avoided. My apparatus also proved that Finkener's plan of providing both parts of the glass pins with glass hooks and forcing them together by means of springs is a totally unnecessary complication.

The first india-rubber joint, and at the same time the only one which requires constant opening and closing, is at the end of the capillary tube *f*, where it is connected with the bent capillary tube *g*, communicating with one of the bores of the Greiner-Friedrichs tap *h*. The other bore of *h* leads to the short capillary tube *i*, the object of which will be explained later on. The double-bore tap *h* forms the upper end of the gas-burette *B*, which is expanded into a bulb below the tap. The bulb contains very nearly 100 c. c.; the division of the burette commences with 100 and is continued to 150 c. c. in tenths of a c. c. Below the mark for 150 c. c. there is still a length of about 10 cm. without any division, and the burette ends at the bottom with a contraction shaped for joining it with the

elastic tube *k*. Tube *k* might be connected directly with the "level tube" *D*; but in the more perfect apparatus the principle of the "gas volumeter' is brought in here. As this may not be familiar to many American readers, I will explain it.

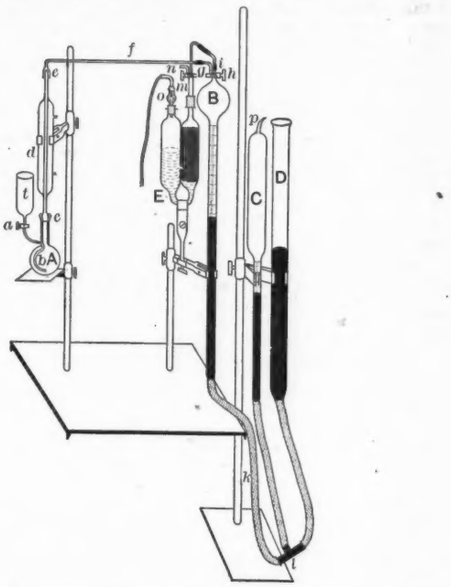
THE GAS VOLUMETER.

The three glass tubes *B*, *C* and *D* are put into mutual communication by means of the T-tube *l*, made of glass or iron, and the three india-rubber tubes *k*. These elastic tubes must be made of the best rubber and with very stout walls, so that they stand the pressure of a high column of mercury without any danger of bursting, and without the necessity of any canvas or wire lining which would interfere with their being tightly bound on the contracted bottom ends of the three glass tubes by means of wire loops. These tubes have the following functions.

Tube *B* is the "gas burette," already described. It serves for containing and measuring the gases evolved in the operation. Since the accuracy of the analytical results entirely depends upon that of the division of that tube, it should be bought from a thoroughly reliable dealer in chemical apparatus. Even then a true chemist will never trust to the accuracy of the division into c. c. (even Geissler's instruments have sometimes been found to be at fault in that respect), but he should himself divide the division by calibration with mercury (which, especially in such cases, is preferable to water), and, if necessary, constructing a table for reducing the nominal to the real contents. With *good* instruments there ought to be no call for such a table, the unavoidable inaccuracies ought to be within the limits of error in reading off; but then it is best to *know* this, instead of merely trusting to the dealer. It is unnecessary to say that these remarks do not refer to the present case alone, but to *all* analytical operations, whether by weight or by volume; but they cannot be often enough repeated.

The second glass tube is the "level tube" *D*, a plain tube, rather wide, and open at the top. It serves not merely for establishing the mercury levels, as denoted by its name, but also as a mercurial pump, and even as a barometer, as we shall see.

The third tube is the "reduction tube" *C*. This is the essential feature



of the instrument. It contains 125 c. c. or 130 c. c., the division commencing below the enlarged portion at 100, and being continued in tenths of a c. c. The tube ends at the top in a glass tap or in a stout capillary tube *p*. Formerly I prepared a glass tap on account of the smaller trouble in the first setting and in any resettings of the apparatus; but I have discarded glass taps for this special object now because it is almost impossible to make a glass tap absolutely tight, not merely for one operation (which is easy enough), but for many continued and considerable alternations of high and low pressure. Moreover, an accidental touch to the tap may disturb its tightness, and as this may happen quite unperceived, gross errors may be committed before the fault has been noticed. On this account I now employ a capillary tube open at first and sealed afterward.

ADJUSTMENT FOR TEMPERATURE AND BAROMETRIC PRESSURE.

The reduction tube *C* must contain a quantity of moist air, which in the dry state, at a temperature of 0°C, and at a barometric pressure of 760 mm. (29·82 in.), would be exactly equal to 100 c. c. This is brought about after putting the apparatus together by *once for all* observing the temperature by an accurate thermometer, as well as the barometric pressure, and making the calculation by the formula to be given later on. We call the temperature, in degrees centigrade, *t*, and the barometric pressure *b*. The latter may, of course, be taken from an ordinary mercurial or aneroid barometer; it must not be forgotten to subtract from the height of mercury directly observed the figure corresponding to the expansion of the mercury, viz.: 1 mm. for temperatures below 12° C., 2 mm. between 13° and 19° C., 3 mm. between 20° and 25° C. If there is no barometer at hand the apparatus may serve as its own barometer. For this purpose we pour a sufficient quantity of mercury into *D*, temporarily close the capillary *p* by means of a little wax or the like, and raise *D* so high that the mercury fills the whole of tube *B* (which must be perfectly dry) and issues at tap *h*. The air inclosed in *C* need not be regarded. Now we lower *D* about 18 ins., in order to see whether tap *h* closes tightly, and whether no air bubbles have remained in *B*. If this be not the case we lower *D* another 12 ins. or so, so that the mercury in *B* leaves the tap and its surface becomes visible. Now we measure the vertical distance between the mercury surfaces in *B* and *D*, which, of course, represents the barometric pressure of the moment.

Having thus observed the magnitudes *t* and *b*, we must calculate the volume of 100 c. c. of dry air in the "normal state" (0° *c* and 760 mm.) under the present conditions of *t* and *b*. This can be done by the formula:

$$V = \frac{100 \times (273 + t)\,760}{273\,(b - f)}.$$

Here *f* stands for the tension of aqueous vapor at the temperature *t*, expressed in millimeters. For temperatures from 10° to 16° C. *f* may be put $= t - 2$; between 17° and 20°, $f = t - 3$; from 21°, again, $f = t - 2$.

For example: we find the temperature = 18° C., the height of mercury in the barometer = 755 mm., hence $b = 753$; $f = t - 3$.

$$V = \frac{100\,(273 + 18)\;760}{273\,(753 - 18 + 3)} = 109.9.$$

We now apply this to our case. We must take care to saturate the air in *C* with moisture; a single drop of water, introduced before putting the apparatus together, or sucked in afterward through the capillary *p*, suffices for this. We now place *D* at such height that the surface of the mercury in *C* stands exactly at the level *V* (in our example at the division 109·9), that in *D* of course on the same level. Now the capillary *p* is sealed by a small flame, taking care not to expand the air in *C*, which is prevented by placing a pasteboard shield between *C* and the lamp. After sealing, convince yourself that the level in *C* is still on the proper height, and secure the end of *p* against accidental injury by means of an india-rubber cap. *You have now enclosed once for all in tube C a quantity of moist air corresponding to* 100 c. c. *of dry air in the normal state, and you may in future omit all observations of temperature and barometric pressure by producing in tube B such a pressure that the mercury in B stands at* 100 c. c. *and at the same time on the same level as in C.* You have then placed the gases in *B* and *C* exactly under the same conditions and the reading in *B* yields at once the volume of the gas as reduced to the dry state to 0° C., and to 760 mm. pressure.

This is facilitated by a special kind of forked clamp in which tubes *B* and *C* are held in such manner that they can be moved up and down individually or else both together without changing their mutual position. I have also constructed a special movable straight-edge provided with a spirit level, for accurately comparing the levels of both surfaces of mercury.

The air in *C* must be saturated with moisture as indicated, because the gas in *B* is afterward measured in the same condition.

If at any time after putting the apparatus together there should be a necessity of once more adjusting the volume of air in *C* (which may happen through some accident), the point of capillary *P* must be broken off, and the observations of temperature, pressures, the calculation of volume *V*, the resetting at that volume and resealing of *p*, must be repeated. If the broken-off end of *p*, is only very short no sensible mistake will be committed; if not *p* must be first drawn out a little further, so that the true volume of 100 c. c. is again attained. It is hardly necessary to say that what has been remarked before about the calibration of tube *B* refers to tube *C* equally well.

ABSORPTION OF THE CARBONIC ACID GAS.

Lastly, we have to describe that portion of the apparatus which is destined for absorbing the carbonic acid. This is done by means of the U-shaped receiver *E*, which we call an "Orsat tube," because it is shaped just like the absorbing tubes employed in Orsat's well-known apparatus for gas analysis. Communication is made by the capillary tube *i*, by a short right-angle capillary, and the double-bore tap *m*, one of whose bores leads from *E* through *i* to *B*, while the other one leads through the short bent tube *n* to the outer air. The joints in this case are purposely not made by sealing the glass parts together, which would make the apparatus very fragile; they are made by means of small pieces of rather thick, soft rubber tubing, tightly bound to the glass by wire loops. Of course the whole is tested before actual use, to see whether all the joints are tight. Tube *E* is filled with a solution of one part of best caustic soda in three parts of water, which serves for many analyses, as there is a guard tube *O*, filled with soda-lime, preventing the access of carbonic acid from the outside air into *E*.

ESTIMATION OF CARBON IN IRON AND STEEL.

We now pass on to the estimation of carbon in iron and steel. The necessary reagents are: (1) A saturated neutral solution of cupric sulphate; (2) a solution of 100 g. chromic acid in 100 c. c. water; (3) sulphuric acid of specific gravity 1·65, saturated with chromic acid; (4) sulphuric acid of specific gravity 1·71, saturated with chromic acid; (5) sulphuric acid of specific gravity 1·10 pure; (6) commercial peroxide of hydrogen.

Since these reagents may contain a small quantity of dissolved carbonic acid, or else of organic substances capable of rendering such on heating, it is advisable (as prescribed by Thörner) to pass a slow stream of air through them while at a boiling heat, and, moreover, to make a blank experiment with them. In our case, for instance, the blank test proved that we had to make a deduction of 0·00107 g. carbon in each actual test.

The kind and quantity of the reagents to be employed, as well as the quantity of substance weighed out, differ according to the description of metal to be analyzed, as shown in the following table:

Carbon, %.	Quantity of iron weighed out, grm.	Cupric sulphate solution, c. c.	Chromic acid solution, c. c.	Sulphuric acid 1·65 c. c.	Sulphuric acid 1·71 c. c.	Sulphuric acid 1·10 c. c.	Hydrogen peroxide. c. c.
Above 1·5	0·4 to 0·5	5	5	135	.....	30	1
1·5 to 0·8	1	10	10	130	.....	25	2
0·8 " 0·5	2	20	20	130	.....	5	2
0·5 " 0·25	3	50	45	.....	75	5	2
Below 0·25	5	50	50	.....	70	5	2

The weighed out sample of iron is placed in flask *A*, the copper solution is poured onto it, and is left in contact with it for a sufficiently long time, with frequent agitation. Our observations, which differ from some of our predecessors', but are entirely in agreement with those made by Professor Treadwell, prove that the action of the copper solution in the case

of pig iron ought not to last less than six hours, while for malleable iron and steel one hour is sufficient. Attempts to shorten this time by increasing the temperature were entirely useless. As mentioned before, this part of the process is common to every process for estimating carbon in iron and steel, and I do not mean to record here more than our own experience, deferring in this respect to the past and future results of observers who have made a special study of this subject. At all events it is unnecessary to separate the carbon on a filter, as the subsequent combustion takes place equally well without that operation.

When the action of the copper solution on the iron is complete, flask *A* is closed by its stopper *c*, forming part of the cooler *d*; the latter is also connected by the capillary tube *f* with the gas burette *B*, which had been previously entirely filled by raising tube *D*. Now the air contained in *A* is exhausted as much as possible by lowering tube *D* as far as it goes, closing tap *h* on the side of *A*, but opening it into *i*, taking the plug out of tap *m*, and, by raising tube *D*, driving out the air previously drawn over from *A* into *B* through *i* and *m* until the mercury has again entirely filled tube *A*. This play is repeated five or six times, whereupon tap *h* is closed.

THE REAGENTS.

Now the reagents enumerated in the table given above are now introduced successively through funnel *t* and tap *a*, the latter being cautiously opened, as the vacuum in *A* will produce a strong suction. First the chromic acid solution is run out; then the strong sulphuric acid (specific gravity 1·71 or 1·65); lastly, the weak acid (1·10). Now tap *a* is closed, tap *h* is opened, tube *D* is lowered as much as possible, and the combustion of the carbon in *A* is started by gently heating flask *A* on asbestos cardboard. Whenever the reaction is too strong the flame is temporarily removed. Thus, the contents of *A* are kept gently boiling for an hour, during which time the tube *D* is always kept so low down that there is always a partial vacuum produced in the apparatus. At the same time cold water is kept running through the cooler *d*; this causes nearly all the water boiling away in *A* to be condensed and to flow back. The condensation is continued in the capillary *f*, and only so much moisture gets into the gas burette *B* that the gas therein may be assumed to be saturated with it. At the end of an hour the flame is removed, 1 or 2 c. c. of peroxide of hydrogen is poured into funnel *t*, and is cautiously admitted through *a* into *A*. On coming into contact with the chromic acid still present in *A*, the H_2O_2 at once gives out oxygen gas, which, on bubbling through the hot liquid, thoroughly expels the slight quantity of CO_2 still dissolved in the latter. At last hot water is drawn into *A* through *t* and *a* until the liquid has filled the whole of *A*, as well as the capillary *f*, as far as tap *h*. This tap is shut, and then the capillary *f* may be detached from *g*, and flask *A* may be prepared for another test.

MEASURING THE VOLUME OF GAS.

The gas, now all contained in *B*, is allowed to stand for ten minutes, which time is entirely sufficient, even without a (wholly unnecessary) water jacket round *B*. In point of fact, the water-cooling in *d* and the air-cooling in *f* are sufficient for bringing the gas down to the temperature of the laboratory, and the large mass of mercury contained in the apparatus quickly establishes the equilibrium of temperature without any further delay or trouble. The gas is now reduced to the "normal state" in the following manner: Tube *D* is fixed in its branch clamp at such a height that the mercury in *C* stands exactly 100 at c. c. Then the forked clamp containing both *C* and *D* is moved up or down till the surfaces of the mercury in *B* and *C* are exactly on the same level, that in *C* being always on the point 100. If the number of c. c. in *B* be now read off, the volume of the gas is got as reduced to the normal state, without taking any notice of the ambient temperature and barometric pressure.

We now know the total volume of gas, being a mixture of the residual air, of carbonic acid and oxygen. We must now remove the carbonic acid and measure the residual volume of gas. But care must be taken lest this volume should be less than 100 c. c., in which case it could not be measured, and the experiment would be lost. We cannot be in any doubt on this point if with the above-mentioned quantities of iron weighed off for analyses the first gaseous volume is not less than 140 c. c. in the case of pig iron, or 130 c. c. in the case of malleable iron or steel. If the gas should be less than that, we must bring it up to the requisite quantity by introducing some air free from carbonic acid. We do this by turning tap *m* so as to communicate with the outer air through *n*, whereupon air will enter through *n* and fill about half of the Orsat tube *E*, its carbonic acid being at once absorbed by the caustic liquor. Now *m* is turned in such manner as to make *E* communicate with *i* and *B*; *D* is lowered to produce aspiration, and by cautiously opening *h* a sufficient quantity of air is drawn over from *E* into *B*, whereupon *h* is shut and the gaseous volume in *B* is measured as described above.

Now tap *m* is again turned so that it communicates through *n* with the outer air, and air is blown with the mouth into the outer limb of *E*, through the soda-lime tube *o*, till the caustic liquor entirely fills the inner limb and begins to issue at *n*. Now tap *m* is turned so that *E* communicates with *i*, *D* is moved upward so as to exert pressure in *B* and by opening tap *h* the gas contained in *B* is forced over into *E* and left there for one minute. Now *D* is lowered so that the gas re-enters into *B*; as soon as the liquor in *E* has again risen to tap *m*, this tap, as well as tap *h*, are shut, and the gas in *B* is measured again, preferably after waiting about 10 minutes. The difference between this and the first reading represents the carbonic acid. Each c. c. of CO_2, measured in the "normal state," is equal to 0·000536 g. carbon.

If the saving of time and trouble is to be carried as far as possible, the quantity of the sample weighed off is so regulated that all calculations of percentage are done away with. In the case of pig iron, 0·268 g. might be taken, in which case each c. c. = 0·2% C; in the case of malleable iron, 2·680 g., each c. c. representing 0·02%, with an error not exceeding 0·001, since it is easy to read $\frac{1}{10}$ c. c.

ADVANTAGES OF THE PROCESS.

I have purposely given a very detailed description of the apparatus and process, enumerating all precautions, enabling any chemist to get satisfactory results without further instructions. This has rendered my paper somewhat lengthy, and may possibly produce the impression that the new apparatus is too complicated and the process too troublesome or difficult. But I can affirm that neither one nor the other is the case. Our apparatus may not be quite as cheap as some others, but this is surely a very secondary consideration in metallurgical laboratories, when the great saving of time and the absolute accuracy of the results are taken into consideration. Nor is it even fragile to any undue extent. Of course glass apparatus cannot be otherwise than fragile; but I avoid too great a rigidity of joints wherever this is possible, and the only pieces rather liable to accidental breakage, viz., the flask *A* and the capillary tube *f*, can be at once secured in duplicate. As far as the process itself is concerned any trained chemist will learn to master it completely in a single day by making a few estimations according to my description; and it can be taught to unscientific laboratory assistants in a short period as well. I therefore venture to hope that the above-described process will meet with approval and practical adoption among American metallurgists, as well as among my own countrymen.

I conclude with giving a few of the analyses performed with the new apparatus, comparing them with the gravimetric analyses of the same samples made by Professor Treadwell in the most careful manner.

A.—PIG IRON.

Weight of Sample. Grms.	CO_2 c. c.	Percentage of Carbon. New Method.	Average.	By Weight.
0·3704	23·50	3·40	3·37	3·39
0·3737	23·57	3·38		
0·3856	24·00	3·34		
		B.—INGOT IRON.		
3·0950	4·63	0·080	0·081	0·082
3·9824	6·12	0·082		
		C.—WROUGHT IRON.		
2·9622	0·60	0·011	0·0126	0·0103
3·0615	0·75	0·013		
4·9687	1·30	0·014		

Transportation on the Ohio River.—A recent bulletin of the Census Office on transportation on the Ohio River and its tributaries above Cincinnati shows that the number of miles of navigable water on the Ohio and its tributaries is 928, excluding the 500 miles from Cincinnati to the mouth of the Ohio. The cost of improvements on these waters was $12,129,713, which is equivalent to $8,494 per mile of navigable water. The total number of passengers, including ferry passengers carried during the year 1889, was 2,573,396, and the total number of tons of freight moved was 10,744,063. The ton mileage of this freight movement was equivalent to 2,076,866,145.

A Volatile Compound of Iron and Carbonic Oxide.—Messrs. Mond and Quincke have discovered a volatile compound of iron and carbonic oxide analogous to the nickel-carbon oxide which was discovered by the same chemists in 1890, although at the time of the announcement of the latter it was stated that all attempts to obtain a similar compound with other metals had been unsuccessful. The discoverers of the new compound stated, in a paper read before the Chemical Society of England, June 13th, 1891, that if very finely divided iron, obtained by reducing iron oxalate in a current of hydrogen at the lowest possible temperature, exceeding but little 400° C., is allowed to cool in hydrogen gas to 80° C., and then treated with carbonic oxide, the issuing gas imparts a yellow color to the flame of a Bunsen burner into which it is introduced, which continues, even at ordinary temperature, for several hours; and by passing it through a heated glass tube a metallic mirror is formed at between 200° C. and 350° C., while at higher temperatures black flakes are formed. On dissolving these mirrors the solutions gave all the known reactions of iron in remarkably brilliant colors. The oxide obtained by dissolving the mirror in nitric acid, precipitating with ammonia, and heating to constant weight, was reduced by hydrogen. It was found to contain 69·93% Fe. Fe = 56, O = 16 require 70·00%. There can thus be no doubt of these mirrors consisting of iron. The black flakes obtained at higher temperature consist of iron and carbon. Combustion of the substance and absorption of the carbonic acid formed in caustic potash showed 79·30% of carbon. Even under most favorable circumstances, however, the amount of iron obtained in this manner was small. Messrs. Mond and Quincke consider it probable that the new substance is iron tetracarbonyl, corresponding to the formula $Ni(CO)_4$.

Italian Lignites.—In their natural condition these lignites contain from 17% to 40% of moisture, and after having been dried in the open air they still have from 10% to 25% of moisture. They have from 5% to 15% of ash, and often contain over 5% of sulphur. The method of utilizing the lignite proposed by Mr. Sapori, which was recently tried with such successful results on the locomotives of the Mediterranean Railway Company running between Rome and Frascati, says *Industries*, consists in a dry distillation of the lignite in retorts similar to those used for the production of gas. A part of the gas produced is used for heating the retorts, and producing coke in addition to the tar (brai) and ammoniacal liquors. The gas thus produced gives, it is stated, a heating power of 8,000 calories, and the coke remaining in the retorts has a heating power of 7,000 calories. From the distillation of 1,243 lbs. of "lignite xiloide" in four hours, Mr. Sapori had a return of 31·15% of gas and 33·38% of coke. The gas, notwithstanding its incomplete purification, gave a light equal to that of gas produced from coal. The lignite gas was found to have a heating power which was capable of getting up steam in the boiler of a locomotive containing 700 litres of water in 45 minutes. The coke obtained from the distillation had no smell and was suitable for industrial and household purposes. Mr. Sapori completed his experiments by manufacturing briquettes with the lignite coke, mixed with tar obtained from the distillation of the same lignite. In consequence of the recent experiments many manufacturers have come to the conclusion that it will be no longer necessary to import fuel and other products from abroad. From investigations made by the Royal Commission of Mines it appears, however, that the lignite coal mines which have been found in Italy up to the present time could not give a regular output of more than 700,000 tons at the utmost. From a geological study of the districts where other workable lignite coal mines are usually found, it appears that the total annual production could never reach 1,000,000 tons under the most favorable hypothesis. In Italy there is an annual consumption of 5,000,000 tons of fuel, so that even if the lignite had an equal heating power to the good qualities of the coal now imported from abroad it would be able to supply only one-fifth part of the requirements of Italian industries.

PROMINENT MEN IN THE MINING INDUSTRY.

Almon Danforth Hodges, Jr.

Almon Danforth Hodges, Jr., one of the most prominent American mining engineers and metallurgists, was born in Providence, R. I., July 16th, 1843. He comes from an old New England family of English origin, which was of considerable note in the early days of the colonies, several of his ancestors achieving distinction in the French and Indian and Revolutionary wars. He himself was a soldier while yet a boy, holding a commission in a Massachusetts regiment during our civil war, as did three of his brothers, of whom two were killed in that unfortunate struggle. Leaving the service, Mr. Hodges entered Harvard College, from which he graduated in 1864. He studied a year more in Cambridge, at the Lawrence Scientific School, and then went to Germany for the purpose of studying mining, spending three years at the *Bergakademie*, at Freiberg, Saxony.

Returning to the United States in 1868, Mr. Hodges determined to strike out at once for the Pacific slope, which at that time undoubtedly offered the greatest attractions for young mining engineers. The summer of 1869 was passed in visiting the principal mining districts of Colorado, Nevada, and California, during which time he wrote a series of articles for the ENGINEERING AND MINING JOURNAL upon mining in Colorado, which attracted considerable attention by their pungent criticisms. Arriving in San Francisco, in the same year, he accepted a position as junior editor of the *Mining and Scientific Press*, with which he remained until 1871, when, being desirous of beginning the practical exercise of his profession, he tendered his resignation.

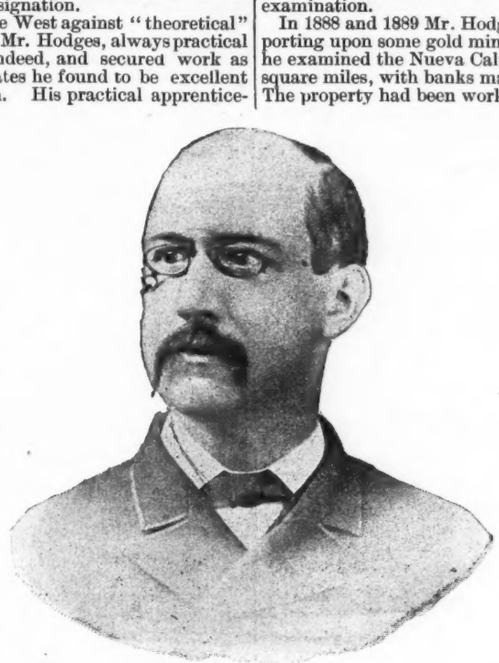
There was at this time a great outcry in the West against "theoretical" in favor of "practical" men in mining, and Mr. Hodges, always practical by nature, determined to be "practical" indeed, and secured work as "pan charger" in a silver mill, which he states he found to be excellent experience both of work and of workingmen. His practical apprenticeship extended over eight and a half years in mills in California and Nevada, during which he worked through all grades to that of superintendent, gaining experience both in the mining and metallurgical treatment of ores of gold, silver, lead, copper, cobalt, and nickel; the manufacture of sulphuric acid, bluestone, copperas and borax; and the refining of precious metals, as well as the financial management of mines and metallurgical works. Much of this time was passed at Dayton in the halcyon days of milling on the Comstock, when the treatment of silver and gold ores by amalgamation was carried with vast strides almost to perfection. Mr. Hodges became one of the most expert millmen upon the lode, and while at the famous Lyon mill found it possible to treat low-grade tailings, assaying but $5 per ton, at a profit of $60,000 to $100,000 annually, at a time when every similar establishment in Nevada had failed.

An important result of Mr. Hodges' work on the Comstock was the development of a process for refining the very coppery bullion obtained in amalgamating tailings, a question which had long puzzled the millmen of Washoe, considerable sums of money having been spent in unsuccessful attempts to solve it. Mr. Hodges' process, which was described at length in the *Transactions of the American Institute of Mining Engineers*, Vol. XIV., proved to be adapted to the conditions existing at Washoe. It saved all the copper which up to that time had been lost, and turned out from one-third to one-half of the silver as fine silver, and collected all the gold in the balance as fine doré bullion. The process, which was a success from the start, was soon adopted by the Bonanza firm, which built a refinery for its application at the Omega mill, near Virginia City, where was refined all the base bullion produced by the mills owned by the Pacific Milling Company. Mr. Hodges resigned his position at Dayton, in 1878, in order to erect these works. The financial results obtained by the new process in this refinery were beyond most sanguine expectations, and it is still in use.

Having finished this work in April, 1878, Mr. Hodges met Mr. W. H. Cilley, General Manager of the Oroya Railroad and Cerro de Pasco Mining Company, of Peru, and made an engagement with him to take charge of the 80-stamp silver mill which the company was about to erect at its mines in Peru. Mr. Hodges superintended the construction of the mill in San Francisco, and after its completion went to Peru to erect it. This was one of the best silver mills built up to that time, all the improvements of the Comstock mills having been embodied in it, together with several new ideas of Mr. Hodges himself. He had *carte blanche* in the erection of this mill, and was assisted by suggestions of Messrs. Lyman and Patton, his friends, who were two of the most expert millmen of Virginia City. The success of the enterprise in Peru was stopped, however, by the war with Chili, which broke out at about that time, and in 1880 Mr. Hodges, having visited many of the important mining districts of the country, returned to the United States.

Mr. Hodges then opened an office as consulting mining engineer, and in March, 1880, made contracts for examining and opening mining properties, which kept him busy for several years in Utah, Nevada, California, Arizona, and New Mexico, and Sonora, Chihuahua, and Sinaloa, in Mexico. Upon the death of his wife in 1884 he determined to give up business. The urgency of many of his friends and former clients, and his own natural restlessness, led him to undertake some important mining commissions subsequently, but he has, since that time, declined general business. In 1886 and 1887 he visited Peru, for the second time, in behalf of a powerful New York syndicate and examined the Cerro de Pasco mining district. This was probably one of the largest and most expensive mining examinations ever made. For a long time there were as many as 60 or 70 men on the pay roll of the expedition, the mechanics and chief assistants having been brought from the United States. Two diamond drills were used in the work, which extended over a year's time. Mr. E. E. Olcott, E. M., of New York, was associated with Mr. Hodges in this examination.

In 1888 and 1889 Mr. Hodges again spent a year in Peru, this time reporting upon some gold mines in that country. Among other properties he examined the Nueva California placer, an immense claim covering 41 square miles, with banks many miles in length, in places as high as 300 ft. The property had been worked by Indians for hundreds of years, and was well opened for examination. Mr. Hodges spent six months at this mine, investigating it in his usual thorough manner. Since his return from Peru in 1889 he has resided in Boston, which is now his home.



ALMON DANFORTH HODGES, JR.

Mr. Hodges has been a frequent contributor to technical publications, many of his articles having been published in the ENGINEERING AND MINING JOURNAL and others in the *Transactions of the American Institute of Mining Engineers* and the *Mining and Scientific Press*, of San Francisco. He has also published one or two translations of small German textbooks and many of his important professional reports. Mr. Hodges is a member of several of the important clubs of Boston, New York, and San Francisco, and other professional and social organizations. He was vice-president and secretary of the American colony at Freiberg, Saxony, in 1867, and recording secretary of the California Academy of Sciences in 1871. He joined the American Institute of Mining Engineers in 1884 and the Technical Society of the Pacific Coast in the same year. He is also a member of the Grand Army of the Republic and the Military Order of the Loyal Legion.

An Immense Cavern in Oregon.—The discovery has been announced of an enormous cavern in Josephine County, Ore., about 12 miles north of the California line and about 40 miles from the coast. There were two openings in the cave, which looked like small fissures in a great limestone bluff. This limestone extends for miles and externally appears massive and solid, but is honeycombed within with cracks and crevices which extend for miles without any apparent order or system. Many of the passages within the cave are described as of great beauty, containing semi-transparent stalactites, giant milk-white pillars, and pools and streams of pure clear water. Several miles from the entrance a small lake of clear water and a waterfall 30 ft. in height were discovered. The only sign of any animal life was found a short distance from the entrance, where a few bones indicated that bears had used it for a lair, carrying their prey there. It was estimated that the main body of the cave, which is undoubtedly of vast extent, was 1,500 ft. from the surface of the mountain.

PRODUCTION OF GOLD AND SILVER IN U.S. IN 1889.*

By R. P. Rothwell.

Through the courtesy of Hon. Robert P. Porter, Superintendent of the Census, and Dr. David T. Day, special agent in charge of the Division of Mines and Mining, we are able to publish an advance abstract of the report upon the production of precious metals in the United States in 1889.

The results of the Census investigation of the precious metal industry are summarized as follows:

PRODUCTION OF BULLION.

	Ounces.	U. S. coining value.
Gold	1,590,869	$32,886,180
Silver	51,354,851	66,396,686
Total		$99,282,866

Coining value of 1 ounce of fine gold, $20·671834; coining value of 1 ounce of fine silver, $1·2929.

LABOR AND WAGES.

The number of men employed above ground was as follows: Foremen or overseers, 1,592: mechanics, 3,279; laborers, 17,121; boys under 16, 82; total, 22,074. The number of men employed below ground was: Foremen or overseers, 1,357; miners, 29,241; laborers, 4,062; boys under 16, 43; total, 34,703. The total number of men employed being 56,777, to which should be added the office force, numbering 873; the grand total is 57,650; the average output per person employed was $1,722.

WAGES AND AVERAGE NUMBER OF DAYS EMPLOYED PER YEAR.

	Av. wages per day.	Av. number of days employed per year.	Av. wages per year.
Above ground.			
Foremen or overseers	$4.03	215	$866
Mechanics	3.55	246	967
Laborers	2.45	197	512
Boys under 16	1.16	172	297
Below ground.			
Foremen or overseers	$4.16	238	$981
Miners	3.07	233	726
Laborers	2.07	238	496
Boys under 16	1.46	203	296

Total average earnings per person employed per year, $749.

EXPENDITURES.

The total wages paid in 1889 amounted to $40,410,672; there was paid to contractors, $1,421,301; and to the office force, $1,347,273, making a total of $43,179,246 for labor. The value of supplies used was $13,817,740. Other expenditures amounted to $6,452,505. The total expenditures were, consequently, $63,449,491.

VALUE OF PLANTS.

The total value of mining plants was $466,015,839, of which $7,565,818 was in buildings; $1,475,674 in railroads on surface; $14,988,840 in machinery; $95,884,666 in underground improvements; $3,921,810 in mine supplies; $4,112,810 in cash, and $338,116,221 as the estimated value of mines, exclusive of the foregoing items.

The value of mill and reduction works was $20,362,872, the value of buildings being $5,685,212, machinery $13,457,488, and supplies $1,220,172. The total value of mines and works was $486,378,711.

RELATIVE IMPORTANCE OF PRODUCING MINES.

The relative importance of procucing mines is shown by the following statement: The number of mines reported producing less than $1,000 bullion was 1,610; from $1,000 to $10,000, 1,408; from $10,000 to $50,000,437; from $50,000 to $100,000, 95; from $100,000 to $250,000, 107; from $250,000 to $500,000, 44; over $500,000, 28; total, 3,729. Mines reported working but not producing bullion, 1,009; mines reported idle, 1,266; total number of mines reported, 6,004. The detailed statistics summarized above are given in the following in due sequence.

RATES OF WAGES IN 1880 AND 1889 COMPARED.

State or Territory.	1880.		1889. Above ground.			1889. Below ground.		
	Foremen.	Miners.	Foremen.	M'chanics.	Laborers.	Foremen.	Miners.	Laborers.
Alabama	$1.00	$1.00	$3.00	$1.50	$0.90	$3.00	$1.25	$0.83
Arizona	5.00	4.00	4.58	3.89	2.47	4.44	3.16	2.24
California	5.00	3.25	3.30	3.10	2.05	3.49	2.74	2.28
Colorado	5.00	3.00	4.29	3.21	2.57	4.21	3.07	2.89
Dakota	5.50	3.50	4.56	4.47	2.85	4.76	3.49	2.70
Georgia	2.00	1.00	1.33	1.47	0.92	1.63	1.19	0.81
Idaho	5.00	4.00	4.63	4.04	2.83	4.78	3.59	3.10
Maine	2.00	1.50						
Montana	5.00	3.50	5.39	4.13	3.33	5.11	3.05	3.12
Nevada	6.50	4.00	5.07	4.56	3.22	4.83	3.60	2.92
New Hampshire	3.00	1.00						
New Mexico	4.50	2.75	4.10	3.48	2.31	4.15	3.10	2.26
North Carolina	2.00	1.00	2.27	1.44	0.88	2.26	1.02	0.85
Oregon	4.00	3.00	3.30	2.92	2.29	3.92	3.01	2.23
Utah	5.00	3.25	5.27	3.23	2.10	4.21	3.03	2.79
Virginia	1.25	1.25	1.38		1.00			
Washington		2.50	5.00	4.00	3.00	4.69	3.43	3.28
Wyoming	4.00	3.00	3.86	3.07	2.36	4.84	3.05	2 36

From the statistics it appears that the labor employed in the actual production of the precious metals is both extremely well paid and very productive, better paid and more productive in fact than that in any other industry thus far (May, 1891) reported in the bulletins issued by the Eleventh Census.

The average earnings of all the persons employed at the gold and silver mines (57,650) was $749 a year, while the average output amounted to $1,722 a year. In the granite mining industry, according to the census report, the average value of the output per person employed in 1889 was $648, and the average wages per annum were $446. In the coal mining west of the Mississippi River the average value of output per person employed was $675. The average wages earned were $469.

The average earnings in the several classes of labor in 1880 and in 1889 are compared in the preceding table. It should be stated that if miners and laborers underground are classed together, as all classes of labor above ground are, the average wages earned underground would be much higher than those who worked above ground who earned $2.45 per day.

The miners for the most part work on contract, so much per ton or per foot of drift, or per cubic yard, while laborers underground are paid by the day. This explains the great difference between the earnings of the two classes.

The statistics of this industry collected by the Tenth Census (1880) were so defective that no comparison of any value can be made with them; it is, however, well known that the average day wages paid in mining throughout the Western States have declined very largely during the past ten years, owing to the lessened cost of living and greater abundance of labor since railroads penetrated the mining districts.

CENSUS RETURNS OF GOLD AND SILVER PRODUCTION.

Unquestionably the most accurate estimate of the total gold produced is that based upon the deposits at the several United States mints and assay offices and at the private refineries and which is adopted by the Director of the Mint. The Census report has therefore added to the direct returns obtained from producers such of these deposits as were "unaccounted for" in these returns, and which evidently represent the many very small sources of production which it will always be impossible to secure directly, and the gold exported in ore or matte.

The total production of gold as given in this report therefore is made up of the Mint and refinery deposits and of gold exported directly by producers. The distribution of this product among the several states and territories differs in some cases widely from, and is unquestionably much more accurate than, the estimates given in other reports. This follows from the more thorough investigation made for the Census and from the more reliable returns obtained from the individual producers.

The following table gives the production of gold and silver as ascertained by the Census investigation:

CENSUS REPORT OF THE GOLD PRODUCT OF THE MINES OF THE UNITED STATES IN 1889.

	Fine ounces.	Value.
Bullion of domestic production at mints and assay offices	1,546,019	$31,959,048
Gold of domestic production (other than United States Mint or assay office bars) exported from the United States as bullion or as gold contained in copper matte	58,652	1,212,444
Bullion of domestic production reported by twenty-six private refineries in the United States as having been made into bars for manufacturers and jewelers	50,009	1,033,778
Total	1,654,680	$34,205,270
Deduct:		
Foreign bullion reported by private refineries in the United States as contained in their product of fine gold bars deposited at mint and assay offices and there classified as of domestic production	63,811	1,319,090
Domestic product for 1889	1,590,869	$32,886,180

This total amount exceeds that of the Director of the Mint by $95,915, which is the aggregate of two items, one of gold contained in certain copper matte and the other of bullion exported, and which were not included in the Mint report. Of this total the

Census direct returns (including certain estimates made upon the spot by Census sub-agents of the production of mines from which official schedules could not be obtained) amount to	$29,483,806
Excess of gold deposited at mints and private refineries over amount traced to its source	3,402,374
Total	$32,886,180

In other words, the Census investigation has traced direct to the mines which produced about 90% of the total gold output.

The production of silver is much more easily traced to its source than is that of gold, for the reasons that it is produced in larger quantity, and being about 20 times as heavy for the same value, is transported through channels more easily followed. The silver produced in the United States all goes either to the private refineries or to the Mint, or is exported direct in ore, in copper matte, or in base bullion. The total obtained by aggregating the amounts reported from these channels corresponds with a surprising degree of closeness to the returns obtained directly from the mines, and is a very convincing proof of the thoroughness of the Census investigation and of the accuracy of its returns.

CENSUS REPORT OF THE SILVER PRODUCT OF MINES IN THE UNITED STATES IN 1889.

	Fine ounces.	Value at $1.2929 per ounce.
Domestic product of fine silver bars reported by the ten private refineries of the United States who manufacture all the fine silver bars	47,864,982	$61,884,635
Unrefined silver of domestic production deposited at mints and assay offices	2,024,700	2,617,735
Silver exported in base bullion, in copper matte, and in ore	1,506,771	1,948,104
Estimated silver product for 1889	51,396,453	$66,450,474
Census direct returns from the mines	51,354,851	66,396,686

Of the silver exported, 877,871 ounces which went out in copper matte and in bullion originating in Montana were not included in the Mint report.

The following table gives the census returns of the gold and silver

* From report for the Eleventh Census.

production of the United States in 1889, distributed to the states where the metal was mined :

PRODUCTION OF GOLD AND SILVER IN 1889 BY STATES.

STATES.	GOLD.		SILVER.		Gold and Silver.
	Fine Ounces.	Value.	Fine Ounces.	Value.	Total.
Alabama	123	$2,539	77	100	$2,639
Alaska	43,762	904,650	9,218	11,918	916,568
Arizona	44,029	910,174	1,812,960	2,343,977	3,254,151
California	608,882	12,586,722	1,062,577	1,373,807	13,960,529
Colorado	187,881	3,883,859	18,375,551	23,757,751	27,641,610
Georgia	5,204	107,605	359	464	108,069
Idaho	95,983	1,984,159	3,137,506	4,056,482	6,040,641
Maryland	501	10,369	.....	.....	10,369
Michigan	4,210	87,040	14,606	18,885	105,925
Montana	151,861	3,139,262	13,511,454	17,468,960	20,608,222
Nevada	169,617	3,506,295	4,696,605	6,072,241	9,578,536
New Mexico	39,457	815,655	1,251,123	1,617,578	2,433,233
North Carolina	7,077	146,295	2,999	3,879	150,174
Oregon	46,648	964,309	17,851	23,080	987,389
South Carolina	2,266	46,853	179	232	47,085
South Dakota	149,533	3,091,137	104,672	135,331	3,226,468
Texas	330	6,828	323,437	418,173	425,001
Utah	23,590	487,667	7,065,192	9,057,014	9,544,681
Virginia	198	4,100	10	13	4,113
Washington	9,005	186,150	28,463	36,801	222,951
Wyoming	711	14,512	.....	.....	14,512
Total	1,590,868	$32,886,180	51,354,839	$66,396,686	$99,282,866

A NEW THEORY OF THE DISEASE DUE TO COMPRESSED AIR.

Written for the Engineering and Mining Journal By Ernest W. Moir, Assoc. M. I. C. E.

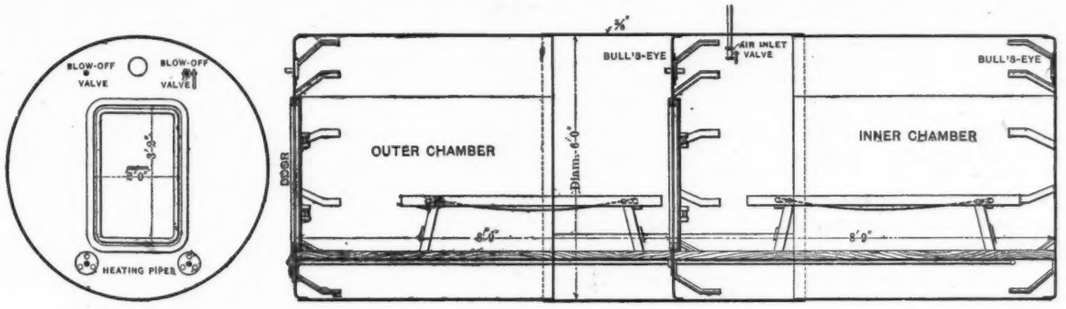
On Monday, June 29th, 1891, Mr. R. P. Rothwell, Editor of ENGINEERING AND MINING JOURNAL, and Mr. W. Saunders, Manager of the Ingersoll-Seargent Drill Company, paid the Hudson Tunnel a visit, going under an air pressure of 31 lbs per sq. in. Mr. Saunders had an experience which illustrates the usefulness of an air chamber designed by the writer for Messrs Pearson & Son, contractors, for the treatment of men suffering from the effects of compressed air. Mr. Saunders was seized with severe pains in his back and partial paralysis, which entirely left him when he was put in this chamber under pressure only two-thirds of that he had just left in the tunnel. The air pressure was very gradually reduced, and Mr. Saunders on coming out was quite free from pain, though feeling somewhat weak. This, however, passed off in a few hours. Men have been placed in this chamber who were completely paralyzed and would have undoubtedly died but for its agency, or remained unable to walk for months.

The writer's theory is new as to the cause of the sickness on coming out of high-pressure air and is here published for criticism. His idea is that the caisson disease or fever is in the severe cases a species of blood-poisoning resulting from the too sudden reduction in the amount of oxygen passed into the lungs. When a man goes under air pressure his pulse quickens and for a time he may feel exhilarated. This quickening of the pulse rate soon dies away, however, and on coming out through the lock the pulse gets below the normal and every man feels more or less languid, while in the high-air pressure a man can do more work and feels generally stronger and will not be inconvenienced by staying in any length of time except when he comes out again. It is the same with the mules which are taken in and kept under air pressure ; they eat more and generally improve in appearance. Candles burn and all forms of combustion go on much more rapidly under air pressure, which all tends to show that a man lives much faster. The number of respirations is not altered and therefore in a pressure of 3 atmospheres, or say 30 lbs., a man takes into his lungs three times the weight of oxygen he would otherwise, provided that the atmosphere is of the same purity.

Now, the system settles down to assimilating a great deal more oxygen under high pressure, and one of two things must follow—either a greater waste of tissue goes on and more carbonic acid (CO_2) is exhaled, or a smaller surface of lung is acted upon to consume the carbon in the blood. The writer is of opinion that the former is the case, viz., that blood carries more carbon due to a greater waste of tissue ; therefore fat people are less able to stand air pressure, and it is dangerous for a stout man to go into a caisson chamber, presumably because he carries more carbonaceous matter in his system. He is all right, however, until he is on his way out, where all the danger is to be looked for. The system has been breathing air containing three times the ordinary weight of oxygen, but on coming through the air lock this supply is suddenly reduced to one-third, with, as a rule, less vigorous action of the heart and fewer respirations. The body does not, however, immediately cease to give up its carbon to the blood vessels, and, there being less oxygen to burn it up, it accumulates. There is no doubt there is much more veinous blood in the system, as is evidenced by the bluish color which many men have in coming out of the chamber, as well as that in very severe cases where bleeding has been resorted to, the blood has been quite thick and congealed.

Does not this condition indicate blood-poisoning? Is it not in this state after snake bites? The use of the chamber comes in at this point, and the way of its working can be followed out. It is merely a compressed air bath, and the air being perfectly pure, coming direct from the engine, does its work much more quickly than the partially nitrated air in the working chamber; hence relief is obtained at a pressure only one-half or two-thirds as great, and by a very gradual lessening of the pressure the system has time to accommodate itself to a reduction in the weight of oxygen passed over the lung surfaces. The lock is more beneficial in the paralyzed forms of the disease than in the painful cases, but there is no doubt it gives relief in both. Mr. Saunders was suffering intense pain, which entirely left him; another visitor became unconscious on leaving the tunnel, and was carried by four men into the air chamber, and in half an hour he walked away feeling all right.

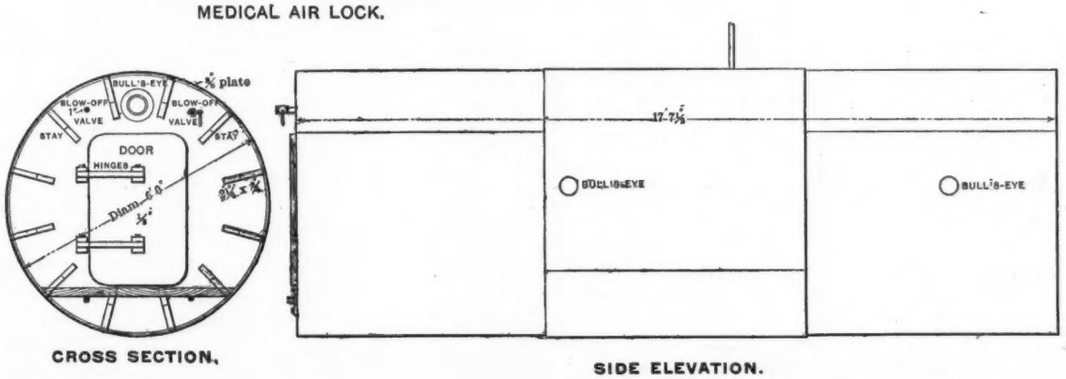
In conclusion : When going in, do so as fast as the drums of your ears will allow. Coming out you can well afford to waste one minute to every five pounds difference in pressure. It is better not to eat or drink much material of a carbonaceous nature, and gradually increase the duration of your visits under pressure. If the air-chamber is too air-tight allow a blow-off through an escape pipe. Give the men coffee just before they come through the air-lock, or immediately after leaving. Do not employ red-faced, over-stout men, and let all be examined by a doctor before starting on such work.



FRONT VIEW. LONGITUDINAL SECTION.

HUDSON RIVER TUNNEL

MEDICAL AIR LOCK.



CROSS SECTION. SIDE ELEVATION.

Blueness of the Sky.—According to a paper recently communicated to the Académie des Sciences, Paris, on observations made at Montpellier, the sky is bluest in the months of December, January, March, and September, and least blue in February, July, August, and November. Speaking in general terms, the sky is of deepest blue in winter, palest blue in summer, and of intermediate depth in spring and autumn.

A NEW DEPARTURE IN MATTE SMELTING FOR COPPER AND SILVER IN REVERBERATORY FURNACES.*

By W. Bettel, Pretoria, South Africa.

In October, 1890, the smelting arrangements at the mine of the Willows Copper (Argentiferous) Syndicate, Limited, near Pretoria, Transvaal, South Africa, being unsatisfactory, I was asked by the managing director of the company to take this department under my supervision, a handsome bonus being promised if I were successful. As I have now earned this in the opinion of the directors, a description of the methods adopted will undoubtedly be of interest, especially as the conditions were somewhat unusual.

The bulk of the ore treated is hydrous oxide of iron and antimonate of iron, with an average of 40 ounces silver per ton of 2,240 pounds, and 4% copper, by wet assay, the copper existing as blue and green carbonates. The absence of sulphur in the ores and fluxes, except in trifling amounts, and the presence of antimony, the amount of which exceeds the percentage of copper, made the problem one of difficulty at first sight.

Other difficulties I had to contend with were bad coal, containing from 18% to 40% ash, which gave little heat in the furnace, and much trouble (with the clinker) in the grate, where huge accretions formed in that part level with the bridge. I found that it was the practice of the furnacemen once every twelve hours to pour water into the grate through holes in the roof to cool the clinker, which was then removed by steel bars and sledge hammers, the furnace being cooled in this manner to such an extent that fully four hours were lost every day.

This led me to devise a method of burning this poor coal to advantage, at the same time preventing the formation of the huge masses of clinker which retarded operations; although after this had been accomplished, as will be seen from the context, there still remained one more difficulty to be overcome.

At the time that I took charge, although the furnace had been running five months, only about 4,000 lbs. of matte had been obtained, opinion being divided as to whether the copper and silver went into the slags, or were, in some way, volatilized. My opinion, that the matte produced had penetrated the imperfectly melted sand bottom and joints of brickwork, and had thus made its way beneath the foundations of the furnace into the "*veldt*" and decomposed diorite beneath it, received no credence, and it was with the greatest difficulty that I persuaded the management to let me "blow out" the furnace and alter another one (not then started), in order to carry out my arrangements with forced draught, then excavate the bottom, etc., from the cooled furnace (there being no vault), and rebuild on an improved plan. This done, it was found that the matte had penetrated 4 ft. 6 in. *below* the furnace bottom into every conceivable crack, lumps of matte 3 and 4 inches in diameter, *with a core of charcoal*, being found here and there. For a time these appearances puzzled us until large roots were found in the soil or "*veldt*" outside, which were similar in shape to the lumps of matte; and it was apparent that the roots had been carbonized, and matte had flowed around the carbonized residue and assumed the shape of the original roots. It was, furthermore, found that about 4 inches of each furnace "bottom" was loose sand—proving that the heat obtained in smelting in the bottoms, and during the subsequent five months' smelting, had been insufficient for ordinary operations. About 60 tons of material (containing about 18 tons of matte) was obtained in the excavation, every joint of the brickwork below the slag line being a conduit for the conveyance of matte to the foundation.

I had therefore to arrange a process for cooling the lower part of furnace bottom, sides, and bridge, by vaults and brick tubes, and working under a forced draught with moist air. When the furnace was ready I decided to melt the sand bottom in successive layers with a material that would cause its cohesion and impart a slight fusibility under intense heat, so as to produce a bottom almost impervious to molten matte. Then, for protection of sides, I found a substance to replace the "mending" ("*daagga*"—a mixture of sand and mud) in some quartz which I had crushed and mixed with a kind of plastic yellow clay. This stood fairly well.

Drawing upon my previous experience in furnace work in England and Wales, where I had been engaged for many years in smelting a great variety of ores, I decided to adopt the following arrangements: (1) To construct vaults as a foundation; over these a number of brick channels (suitably arranged along the whole width of the furnace), covered with bricks (rubbed joints and grouted), communicating with a steam-blast arrangement at one corner of the flue end of the furnace to ashpit at outlets, and, after cooling bridge, to blowpipe jets in bridge and roof; (2) to work the furnace under pressure with closed ashpit, using an ejector arrangement similar to, but simpler than, the Köerting ejector.

These arrangements gave me the following advantages: (*a*) I could reduce the heat in the grate, making the ash loose and friable, and (*b*) transfer such heat (as well as heat from furnace bottom abstracted by passage of air and steam through the brick tubes) in the form of hydrogen and carbonic oxide, to the laboratory—the hearth—of the furnace where these gases are burned with the hot-blast from roof and bridge, producing an intense temperature similar to that obtained in a Siemens regenerative gas furnace.

Having, by the brickwork tubes or channels, considerably reduced the usual depth between skimming plate and bottom, I smelted the bottom in three thin layers, the first two with sifted sand to which 1½ per cent. lime was added and intimately mixed, and on this a seasoning charge of sharp slags smelted. The upper layer consisted of sifted river sand only, which, after smelting, was seasoned as before. During the smelting the heat had to be checked, as the bricks, although nearly as infusible as those of the Abernant Dinas Company, could not withstand the intense heat produced.

The next problem was to smelt refractory antimonial oxide and carbonate ores (70% of which was delivered to furnaces in pieces from 2½ inches to 3 inches cube) *without sulphides* (except in traces) and still produce clean slag, collecting at least 90% of the copper and silver, at one operation in the species of matte or speiss produced, at a profit, coal being 50s. per ton of 2,000 pounds, stores generally about 500% over English prices, and white labor £27 per month (furnacemen). This I solved in the following manner: I selected as a type of slag which would be as economical as any, Dr. Malvern W. Iles' type C, containing about 27% silica. This I produced by means of a flux from one of our waste heaps from part of the mine, a siliceous carbonate of iron, lime, and magnesia, containing 5% and upward of anthracitic carbon. This, together with coal and "cobbing" and rich sharp slags, composed the fluxing part of our charges. The coarse ore which we are compelled to put in the charge, on account of absence of crushing appliances, takes a considerable time to smelt, the heat of slag formation being proportionately high; otherwise, were we able to more thoroughly mix the charges, judging from the fluid slag produced and its melting temperature, the capacity of our furnaces would be doubled. However, three charges are smelted in 24 hours in each furnace, clean slags are produced, the copper and silver are converted into a "matte"—*copper antimonide* being the collecting agent in place of copper sulphide—and over 90% of the copper and silver is recovered.

My explanation of the changes involved in the process, is as follows: Oxides of antimony fluxed with lime (and magnesia) will dissolved in a bath of basic ferrous silicate, and be reduced by carbon conjointly with copper and silver, forming a fusible and brittle argentiferous antimonide of copper (having a formula of Sb_2Cu_5) provided that the slag does not contain more than 5% magnetic oxide of iron; otherwise the slag is rich, copper and antimony are lost, and some silver volatilized. Excess of carbon is avoided, as tending to throw down metallic iron, making the matte coarse and difficult to break.

After satisfying myself that the bottom of No. 1 furnace was in proper working order, I commenced to smelt, and found after three charges that I had saturated the bottom of a three-ton furnace with 500 pounds matte, instead of 36,000 pounds, which was lost in the old furnace. At the time of writing, the bottom is in excellent order, and the furnace is delivering over 90% copper and silver in form of matte. For ores with 35 ounces silver per ton, we concentrate 16·4 tons of ore (or 27·5 tons of charge) into one ton of matte; 91·3% of silver is recovered, about 7·5% to 8% going into slag, and the remainder volatilized. We should, on 35 ounces ores, consider 80% recovery fairly good, and this was the percentage of extraction I had agreed to accomplish. The average composition of slag and matte is seen from the following analysis made from the No. 1 furnace:

SLAG.

	Per cent.		Per cent.		Per cent.
Silica	27·05	Arsenious	·055	Lead oxide	·45
Ferrous oxide	53·30	Antimonious	·130	Lime	5·32
Ferric oxide	2·55	Cuprous oxide	·45	Magnesia	2·80
Alumina	4·50	Silver	·005		
Manganous oxide	3·00	Sulphur	·05	Total	99·97
Phosphoric acid	·21	Bismuth oxide	·10		

MATTE.

	Per cent.		Per cent.		Per cent.
Copper	52·50	Sulphur	2·06	†Silver	1·59
Antimony	38·00	Iron	3·60		
Arsenic	2·00	Lead	·25	Total	100·00

† 520 ounces silver per ton (2,240 pounds).

The siliceous iron-magnesian limestone is fairly represented by the following analysis, although the material is far from uniform in composition: Siliceous insoluble matter, principally quartz, 37·40%; alumina, with trace of manganese oxide, 2·94%; ferrous carbonate, 9·57%; calcium carbonate, 30·40%; magnesium carbonate, 8·92%; water and volatile matter, 5·77%; carbon (anthracitic), 5·00%; total, 100·00%.

The antimonial copper matte which we produce by an oxidizing treatment in a special form of hot-blast blowpipe reverberatory furnace yielded a crude copper in shot (for silver extraction) assaying: Copper, 93·55%; antimony, 1·31%; arsenic, ·60%; silver, 3·26%; or 1,064·9 ounces per ton of 2,240 pounds; oxygen and other substances not estimated, 1·28%; total, 100·00%. This crude copper contained practically all the silver—the slag containing about 15 ounces silver per ton and also 12% of the copper and 10% of the antimony in original matte. The remainder of the antimony volatilized.

Although at the Willows Copper (Argentiferous) Syndicate's works it was inconvenient to interfere with the arrangement of flues, still, the steam for steam blast may be raised by means of heat from waste furnace gases, as is done in iron and steel works. Here we use an 8 horse power locomotive boiler to supply steam blast to two furnaces. This boiler consumes 800 pounds coal per 24 hours, delivering steam at 20 pounds pressure through four jets $\frac{5}{8}$ inch (base) diameter, of which there are two at each furnace. The influence of steam in preventing the formation of all except "rotten" clinker is most marked, and with my arrangements the commonest coal can be made to yield good results, while with good coal the increased duty obtained (especially with the arrangement for heating the moist air) is very striking. Another peculiarity is that the coal is burned to a clean ash, and the only coal or coke which falls through the bars is during grating, and that is small in amount. By adapting this furnace to copper smelting, any grade of matte may be obtained, according to the character of flame produced, which may be altered at will from reducing to oxidizing or neutral, by suitable valves in air passages, while for metal or regulus roasting and copper refining it could not be surpassed for ease and cheapness in working.

There is a modification of this hot-blast reverberatory furnace—for civilized places, where decent iron castings and wrought-iron fittings are procurable at reasonable rates—which I propose to work elsewhere if opportunity occurs. This plan embraces water-jacketing portions of the furnace most exposed to wear, and does not need more than a few inches foundation (concrete); no vault is needed. From results already obtained, I expect that furnace to be more economical than a gas furnace with regenerator, and, with certain modifications, to be applicable to any operation requiring an intense heat, which may be made oxidizing, neutral, or reducing, at will.

Chemical News, June 26, 1891.

Mineral Black.—A manufactory of mineral black and tripoli has been established at La Faye, France, by M. Voiret, who produces annually some 400,000 kilos. of the black and about half the quantity of the tripoli, says the *Chemist and Druggist*. Mineral black is the residue of thorough incineration of schist (shale) in closed vessels. It is thus calcined for eight hours, and what remains is gathered in closed metal boxes and then cooled without being exposed to the air. It is then carefully sorted and ground to fine powder. This substance, known as "Auvergné black," is said to be obtaining popular favor for ship-painting, blacking, printing ink, varnish, and other purposes for which an intense black is required.

URANIUM IN THE BLACK HILLS.

Uranium has been found in the Bald Mountain District in the Black Hills in such large quantities, says Herman Reinbold in the *Scientific American*, as to warrant the prospect of early production of uranium salts, as well as the metal uranium, in the United States.

At present uranium mining is carried on only in two places in the world, namely, at Annaberg, Saxony, and Redruth, Cornwall, and the scarcity of the mineral has been the cause of its not being used for a very important purpose—the manufacture of steel.

In Europe uranium has only been found in pockets in form of pitchblende, which is uranous and uranic oxide (40% of uranous and 54% of uranic oxide) combined with silica, lead, iron, and manganese; the other uranium ores appearing in such small quantities as not to be commercially valuable. Mr. Reinbold, who made an examination of the different uranium ores at Bald Mountain, S. D., found the following minerals in a depth of only a few feet, the rock being of the archæan formation:

1. Uranit (uraniumglimmer) embedded in the rock and the seams, in greenish yellow scales, the vein running vertically and being 40 ft. wide on the surface. An analysis shows it to be (U_2O_3) 2 PO_4, Cu. As a source for uranium this mineral cannot be used, the costs of concentrating being too high.

2. Pitchblende. This mineral appears in seams, together with the above-mentioned scales. From all appearances the rock contains large quantities in greater depths, the conditions being analogous with those at Cornwall. Its composition is U_3O_4, with iron, lead, magnesia, and manganese, also silica.

3. Uraniumochre (U_2O_3) 3 SO_3 and uranochalcit U_2O_4 (Fe, Ca) O SO_3, H_2O, in large bodies of kidney-shaped form; and

4. Trogerit, 3 UO_3, As_2O_5.

All these ores, with the exception of the first one mentioned, may be converted into uranium salts, which are commercially valuable. The chloride, nitrate, and sulphate of uranium are used in the manufacture of stained glass, producing a greenish yellow tint, peculiar to them. They are also used in coloring porcelain (black porcelain), and to some extent in photography. Germany and France are the principal consumers, and lately the output in Europe has decreased, and the price of uranium advanced materially, its cost being now $10 a pound. The amount of uranium consumed in the manufacture of glass and porcelain is, however, very limited.

Experiments and tests which have been made by the great steel and gun manufacturers in England and Germany have shown that the addition of a small percentage of uranium to steel increases its elasticity, and at the same time its hardness, to an extent that makes its use in the manufacture of guns, armor plates, etc., most desirable, but the scarcity of the material and especially the great difficulty in reducing the ore to metal makes the price of uranium steel too high. If the recent discoveries in the Black Hills prove as important as present indications are that they will, it is likely that the metal can be produced cheaply enough to be used for this purpose.

MAGNOLIA METAL PIT-TUB AND WAGON BEARINGS.

The Magnolia Anti-Friction Metal Company, of New York, has recently introduced a new application of magnolia metal for pit-tub and wagon bearings in collieries. As will be seen from the accompanying sketch, it is an ordinary metal cod or pedestal bearing, lined with magnolia anti-friction metal properly fitted in, for which it is claimed that the superior anti-friction properties of the bearings insure great economy in lubrication. When these bearings are worn down the magnolia metal can be renewed by any mechanic at the colliery, and the iron or steel body of

the bearing will last an indefinite period, breakages of course excepted whereas, under the present system of steel axle against steel bearing, both get worn out and have to be frequently renewed. With these magnolia-lined bearings, it is asserted that the axle receiving an enameled surface from the magnolia metal does not show any appreciable wear, and will probably outlast the tub itself. It is also claimed that it has been found on extended trial that the lessened friction with these magnolia-lined bearings enables a greater number of tubs to be hauled by a given engine power.

The Photochronograph.—An invention of considerable importance in astromony has been made at the Georgetown College Observatory. By means of an instrument called the photochronograph, a star is caused to record with absolute accuracy the time of its own transit across the meridian, thus eliminating all personal errors.

Berdan's Mechanical Fuse for Bombs.—The Chief of Ordnance of the U. S. Army has just received a report from the commanding officer of the proving grounds at Sandy Hook, N. Y., on the trials recently made by him of the mechanical fuse invented by General Berdan. This fuse is so constructed as to utilize the rotary motion of the shell when passing through the air, so as to cause the shell to explode when it has made the number of revolutions at which the fuse has been set, in place of the common time fuse, with burning composition, which is known to be full of of many inherent difficulties. The object of this trial was to determine whether or not this device would operate under the shock in firing and rapid rotation. Two shots were fired from an 8-in. gun into a butt of sand at a distance of 1,500 ft. The shells were recovered, and when taken apart it was found that the fuse registered, as nearly as could be determined with the play in the screws, 50 turns, which was the required distance, the pitch of the rifling being one turn in 30 ft. It is said that the Chief of Ordnance will ask the Board of Ordnance and Fortifications, at its next meeting, to grant an additional allotment for trials to perfect the details of the new device.

NEW FORM OF AIR BATH.*

By F. R. Bennet.

The air bath described is the design of Mr. Maunsel White, of the Bethlehem Iron Co. It has been in use for several years, and has proved so convenient that it seems worthy of description. In the accompanying cuts is shown a general view and section. In Fig. 1, *a* is a hole through which a thermometer is inserted; two holes to either side, not shown, permit the escape of the gases of combustion. *b* is a door having double panes of glass, about ¼-in. apart, forming a non-conducting air space; around the door is fastened a flanged strip of sheet copper,

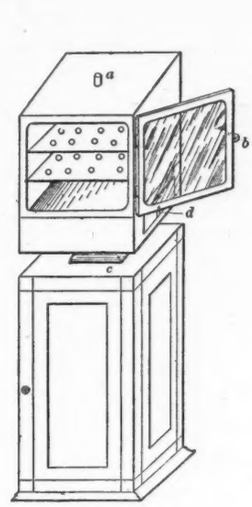


FIG. 1.

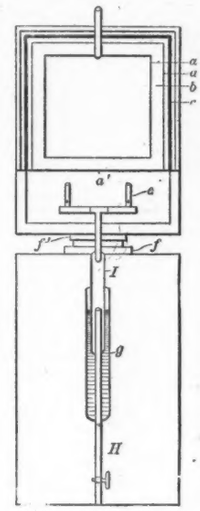
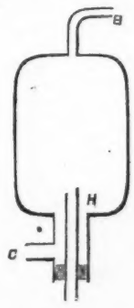


FIG. 2.

which makes a lip that fits tightly into the bath, serving to keep the door firmly closed and excluding the air; another similar door is placed at the back which is not shown in the cut; *c* is a pivot on which the bath may be revolved without interfering with the flow of gas. *d* is the combustion chamber, the sides of which are open, but protected with flaps of asbestos board. In Fig. 2, *a* is the baffle plate with holes to permit heated gases to pass around copper box of bath. *b* is a brass disk let into wooden frame to hold bath central and give plane of rotation; *c* is a brass support fitted with two branch pipes to supply gas. The support is securely bolted to the ¼-in. iron plate which forms the bottom of the combustion chamber; *d* are openings around jets to supply air for combustion; *e* and *f* are brass pipes fastened to the globe joint *h*; *f* is the supply pipe, and passes up into *e*, which is secured to *c*. The outside box of bath is made of $\frac{1}{16}$-in. sheet iron; *g* is filled about three-fourths full of oil, making a gas-sealed joint. The advantages of this bath are better utilization of heat, uniformity of temperature throughout the bath, and ease and convenience of manipulation.

THE LIGHT FROM BURNING SODIUM.

In the course of some lectures delivered recently at the Royal Institution by Professor Dewar, a curious experiment by M. Cornu was repeated, bearing relation to the question whether the yellow light emitted by flames charged with common salt is due to metallic sodium or to the undecomposed molecules of chloride of sodium. Into a large glass globe a tube *H*, in the accompanying cut, for which we are indebted to *The Engineer*, conveying hydrogen to the flame at the mouth of the tube, wa



inserted; the hydrogen was charged with solution of chloride of sodium by means of an ordinary spray jet; through *C* chlorine entered, and the products of combustion were carried off through *B* to potash apparatus, to prevent the fumes entering the theatre. Under these circumstances, in an atmosphere of hydrogen burning in chlorine, it is impossible that metallic sodium can exist, and an ordinary hydrogen instead of the yellow sodium flame is seen. This shows that in ordinary flames charged with common salt the yellowness is due to free metallic sodium.

* *Journal of Analytical and Applied Chem.*, July, 1891.

THE FREE-COINAGE DISCUSSION.

Senator Stewart, of Nevada, in replying to Mr. Carnegie's article published in these pages last week, devotes the greater part of a long letter in the *New York World* of June 21st to abusing and ridiculing Mr. Carnegie. The following extracts from this letter are the only portions which actually touch the subject of free coinage of money.

1. The people of the civilized world, when silver was repudiated, were indebted not less than a hundred thousand millions. Every contract by which that vast indebtedness was incurred provided for payment in either gold or silver. The debtor did not agree to pay gold. The contract gave him the option to pay in either metal. You and your associates excluded silver from the mints of the United States and Europe, and thereby compelled payment in gold alone. Your conscience does not reproach you for violating contracts and doubling the obligations of the debtor; but for any attempt to right the wrong you bow your head in shame.

2. You truthfully say that "the one essential quality that is needed n the article which we use as a basis for exchanging all other articles is fixity of value."

Your argument is that because the value of gold cannot be changed it s the only material fit for use as money. Suppose that all the rocks were gold: would an ounce of that metal buy the same amount of iron or steel that it now does? If gold were so plentiful all over the world as to render it necessary to remove it from the land before the soil could be cultivated, would not its value be changed? By what process of reasoning did you reach the conclusion that *the value of gold did not depend upon the law of supply and demand*? You cannot be ignorant of the axiom that *value depends upon the law of supply and demand.* An unlimited supply of anything, however desirable, destroys its value. On the other hand, suppose that no more gold could be mined, and that one-half of the stock on hand were lost or destroyed: would not an ounce of gold buy more property than it now does? Has not the purchasing power of gold increased from 30% to 40% since silver was demonetized and one-half of the supply of money metal cut off?

You know full well that there is not gold enough in the world to supply the demand for money. You have already compelled the people of this country to sell their property at a discount of from 30% to 50% to buy gold to pay obligations contracted to be paid in gold, silver, or paper.

Do you not know that the purchase of fifty millions of gold on European account in the last few months has checked production, paralyzed business, and produced universal alarm?

3. When you deprived silver of its royal right to coinage, and conferred the honors, which had been enjoyed by the two precious metals for thousands of years, upon gold alone, you not only made gold more precious, but you more than doubled the duties it was required to perform. It was the only precious metal in the commercial world recognized by law, and became an object of universal desire. It is a growing necessity in dentistry, photography, and many other arts. Its enhanced value has increased the demand for its use in ornamenting the palaces of the rich.

The growing necessities of the arts for gold must be supplied. The demand for gold for non-monetary purposes is rapidly increasing. It already consumes nearly, if not quite, all the annual supply from the mines, and little, if any, is left for coinage. No material increase in the accumulated stock of gold coin has been made since silver was demonetized. Many well-informed statisticians contend that there is less gold coin in the commercial world than there was fifteen years ago. The meager reserves of gold in Europe and America corroborate their contention. Population and business have expanded out of all proportion to the supply of gold coin.

Your scheme of checks and bills of exchange as substitutes for gold has been tried and found wanting. Paper devices facilitate commerce as representatives of money, and not otherwise. The slightest doubt of failure of payment on presentation under the moneyed systems of the world destroys their use. It is true that while confidence can be maintained they are as good as coin, but the want of coin destroys confidence. The more coin the more confidence. If checks and bills of exchange would answer the purpose of money, why use anything else? Nearly everybody can draw checks; and if it were not necessary to have a bank account upon which to draw them, there would be no need of either gold or silver.

You say, "What, then, has raised this silver question, which everybody is discussing?" Just this fact: That while the supply, and therefore the value, of gold remained the same, great deposits of silver were discovered, wonderful improvements made in mining machinery, and still more wonderful in the machinery for refining silver ore; and as more and more silver was produced at less cost, its value naturally fell more and more, one ounce of it, worth $1.33 in 1872, being worth to-day only $1.04.

4. It is true that silver has fallen in value as compared with gold, but its value as compared with commodities is as great as when the gold conspiracy excluded it from the mints of the United States and Europe. The price of gold has advanced because legislation has forced the money demand for gold and silver upon gold alone. It is not true, as you would have us believe, that an over-production of silver was the reason for its demonetization.

The world's production of silver in 1873, when the United States took the initiative in monometalism, was only $81,800,000, while in the same year the production of gold was $96,200,000. Nor is your assumption that silver was demonetized because it had depreciated in value, true. The very day that the act codifying the mint laws of the United States, which omitted the silver dollar, passed Congress, the silver in the silver dollar was worth 3 per cent. more than the gold in the gold dollar. It is true that after Europe followed our example, and cut off the demand for silver for coinage purposes, the price of silver as compared with gold declined. The value of silver is no more exempt from the law of supply and demand than that of gold.

Silver was not demonetized because gold was the better metal for use as money. On the contrary, the effort to destroy one of the precious metals to enhance the value of money commenced with an effort to demonetize gold. Chevalier and Maclaren and their followers, between 1850 and 1860, were clamorous in their demands for the exclusion of gold from the mints of the civilized world, for the avowed purpose of enhancing the value of bonds, annuities, and fixed incomes. They contended then that silver was the only metal possessing fixity of value, and that gold was unfit for use as money on account of its uncertain and spasmodic production.

Germany, Austria, and Holland ceased coining gold, and made silver coin their standard money. France and the Latin Union remained firm to bimetalism until long after the Franco-Prussian war. Finally, in 1876, the gold standard contractionists succeeded in closing every mint in Europe against silver, since which time the average range of prices of commodities, as compared with gold, has declined between 30% and 40%; and as compared with silver the average price of commodities has been comparatively stationary.

5. If silver had not been demonetized it would have been at par with gold to-day. *There has been no inequality in the production of the two metals which could have affected their relative value. In no period of the world's history has their production been so nearly equal as during the last seventeen years. Legislation, and legislation alone, advanced gold and depressed silver.*

While each had free access to the mints of the United States and the Latin Union, their relative value, as fixed by law, could not be changed by production, for, while a given quantity of gold and a given quantity of silver can be coined into a dollar, a franc, or a pound, the value of such given quantities must always be the same. Nine-tenths of the demand for the precious metals has always been a money demand; such money demand is purely artificial and dependent upon legislation or other governmental action. If either were rejected as money throughout the entire world, nine-tenths of its value would be lost.

If you succeed in preventing legislation for the restoration of silver you will demonetize gold. The people will have some kind of money; and inasmuch as there is not gold enough they will have silver. Failing to obtain that they will have fiat paper. The issue, my dear sir, is whether both gold and silver shall be used, or both discarded and paper substituted.

You tell us that "if the free coinage of silver becomes a law our farmers will find themselves just in the position of the Indian farmer." What do you mean by that? Do you mean that the Indian farmer has been injured by cheap silver? This was not the view taken by the English royal commission. Every witness that appeared before that commission and testified on the subject asserted that cheap silver had stimulated the production of farm products in India; that the purchasing power of silver was not materially changed by reason of its demonetization in Europe and the United States; and that cheap silver gave the Indian farmer such an advantage in the European market as gradually to drive the American farmer therefrom and liberate England from paying tribute to the United States.

Mark the effect of cheap silver. In 1880 India, Russia, the United States, the Argentine Republic and the Australian Colonies substantially furnished Europe with wheat. Of the amount furnished by the countries named the United States contributed over 69%. Her contribution from that time until now, as compared with the other countries named, has constantly declined. In 1890 she contributed less than 23%. The Australian Colonies, which are on a gold basis, suffered in like proportion. They sold 13,000,000 bushels of wheat in the European market in 1880. In 1890 only 4,500,000 bushels were imported into Europe from that country.

You say the American farmer "will thus (by free coinage) have to sell cheap and buy dear. This is just what is troubling India and the South American republics." Do you pretend to say that the American farmer, selling in the same market as the Indian and South American farmer, is not now compelled to sell for the same price? He certainly can obtain no more silver, or its equivalent in gold, for the same article than the Indian farmer. The trouble is that the American farmer must sell for silver, or its equivalent, to compete with the Indian farmer. The money which the American farmer receives must be exchanged for gold at a large discount before it can be used at home, while the silver that the Indian farmer receives is pay in India.

I agree with you that fixity of value is the foundation of money, but value can be fixed only by supply and demand. The value of each unit of money, other things being equal, is determined by the number of units in circulation. The only possible way of maintaining a fixity of the value of money is to keep a constant supply equal to the demand.

The exchange of the money of one country for that of another is not commerce. Commerce consists in the interchange of commodities. Money is for use at home. Commodities are for sale in all markets. No country should buy more commodities than it can pay for in its own productions. If it exports its money it creates contraction, stagnation, and prevents production. Foreign balances are not settled in money, but in commodities. Money itself when transported out of the jurisdiction where it was created is a commodity. Foreign balances are settled by a well-established system of exchange. It is the duty of the banker to know the value of the money of every country, which is determined by its purchasing power in that country. Such knowledge enables him to exchange the money of one country for that of another for the benefit of commerce. All that is needed to secure prosperity is an adequate supply of money for domestic trade and commerce. Foreign commerce will take care of itself.

There never was a universal currency, and never can be. There is no reason why there should be. Plenty of money at home will increase enterprise and production. If we could be freed from contraction we would sell more than we would buy, and the people would prosper.

Influence of Forests on Temperature.—A comprehensive study of the influence of forests on the daily variation of air temperature has been recently made by Professor Müttrich (*Nature*, May 21), the data being from stations in Germany and Austria. *Inter alia*, this influence is greater in May to September or October than in the other months. In pine and fir woods it rises gradually from January to a maximum in August or September, then falls more quickly to a minimum in December; but in beech woods a minimum occurs in April, then there is a quick rise, till the maximum is reached in July. The daily variation itself is greatest in May or June, both in forest and open country. The influence of the forest is to lower the maxima and raise the minima, and the former influence is in most months greater than the latter; in December and January, and occasionally in neighboring months, it is less. The influence on the maxima in summer is greatest in beech woods, less in pine and least in fir. The absolute value of the influence in woods of a given kind of tree is affected by the degree of density of the woods, being higher the denser the woods.

INJURY TO MINERS' EYESIGHT BY SAFETY LAMPS.

Mr. Stokes, H. M. Chief Inspector of Mines for the Midland District of the United Kingdom, expressed the opinion in his report for 1890 that the statements frequently made that the introduction of safety lamps is proving injurious to the eyesight of miners was one of sentiment rather than fact. The Derbyshire Miners' Association, entering into a controversy with Mr. Stokes, instructed Dr. J. Court, of Stavely, near Chesterfield, to thoroughly sift the matter. The latter has recently issued his report, in which he states that his practice at Stavely, during 25 years, has shown great increase in cases of nystagmus and that this increase is contemporary with the increase in the number of safety lamps in use. A brief statement of the results of Dr. Court's investigation was published in the ENGINEERING AND MINING JOURNAL of June 20th, 1891, but further details are of interest.

Dr. Court set himself to answer three questions: (1) Does a special disease exist of the eyesight among the miners of the Midland district, and to what extent? (2) What is the cause? (3) Is there a remedy?

A total of 1,097 persons were examined, and of these 524 used safety lamps and 573 used naked lights. Two diseases were found to exist, viz., nystagmus, which consists of peculiar oscillations of the eyeballs quite uncontrolled by the will, and photophobia, or inability to bear a bright light; that is, the person afflicted is afraid of the light, and cannot bear a bright light when coming out of darkness.

LIST AND DETAILS OF PERSONS EXAMINED.

	Nystagmus.	Photophobia.	Night blindness.
Persons engaged in safety-lamp collieries	160	60	127
Persons using safety lamps in naked-light collieries	4	..	...
Persons using candles	3	..	i
Persons using torch following safety lamps	6	..	...
Persons using candles following safety lamps	23	i	ii

Collieries.	Using— Naked lights. Torch.	Naked lights. C'ndles	Safety lamps.	Safety lamps in candle pit.	Eye disease found in safety-lamp collieries. N'stagmus.	Photophobia	Night blindness.	Eye disease in naked-lamp collieries (nystagmus).
Stallmen	200	256	381	....	145	54	117	*5
Holers	21	23	31	....	8	2	3	*1
Loaders	7	46	62	....	6	4	7	....
Deputies	....	....	....	10	....	....	....	†3
Headers	....	....	7	....	....	....	....	....
Putters	....	....	3	....	1	....	....	....
Pony drivers	...	....	29	....	..	1	....	....
Daymen	....	10	11	....	....	....	....	....

* All had worked in safety-lamp collieries previously. † Carried safety lamps.

The number cured by naked lights after using safety lamps was as follows: Torch, 19; candle, 8; improved by candles, 14.

These facts clearly show that there is something which has an untoward effect on the eyes of persons working with safety lamps. Dr. Snell, of Sheffield, attributes this partly to the position of the collier when at work—on account of the obliquity of his position, particularly when holing. Dr. Court, however, takes the opposite view, stating that he is satisfied that "the feeble light of the safety lamp is at the root of the mischief." He determined from his own photometric tests that the light from a Marsaut lamp was but 0·75 of that of an ordinary pit candle, and that the same lamps, after being used all day, only emitted three-quarters of the light of clean lamps. Eighteen lamps were tested. He also found by means of the photometer that a torch-lamp light was equal to 2¼ candles. By taking into account the shadow cast by the Marsaut bonnet, Dr. Court reduces the effective illumination to ⅘ of a candle; thus if a lamp is hung at an equal distance between the roof and floor in a place 6 ft. high, the shadow on the roof is 5 ft. in diameter, and that on the floor 8 ft. in diameter. With these facts Dr. Court comes to the final conclusion that the diseases he has tabulated are entirely due "to the insufficiency of the light of a safety lamp, combined with the difficult and trying conditions of the light and shade of a bonneted safety lamp."

Concerning the matter Mr. James Ashworth, of Morley, near Derby, in a communication to the *Iron and Coal Trades Review*, says: "At first sight his facts would seem conclusive, but practical men will notice that all the headers working with safety lamps are free from disease. Why should this be so? Simply because these men are always at work with their bonneted lamps behind them, and the light is never or seldom on their faces. Likewise a man using a candle does not place it in a position to light his own face, but that of the work he is engaged on—for instance, adhering to a prop or some convenient pack, tram, or lump of coal: consequently his eyes are almost always in the shade. If the torch is hooked in front of a person's cap his eyes are completely shaded, and, likewise, if it be on the floor the reservoir of the lamp forms a shade for his eyes. No person at work under ground will by choice place a light in such a position that its rays fall on his eyes; and it is equally certain that he cannot manœuvre a safety lamp as easily as he can a candle. The consequence is that holers in particular have one eye almost constantly exposed to the rays of light from one side of their lamps, and not only so, but to a very strong reflected light created by the bright coal face behind their lamps. This is proved very clearly by Dr. Court's figures, viz., that out of 31 holers 13 were affected, but out of 62 loaders only 17 were affected, or in the proportion of 42% to 27%, thus clearly showing again, as in the case of the header, that the person who can work with his eyes free from the glass glare is least affected by eye disease. Pony drivers' eyes are always in the shade, daymen's also. Hence it is not surprising to find that there was only one case of photophobia out of 40 persons examined, and no nystagmus. The use of safety lamps is not in many districts a new evil; yet it has been known for a long time previously to bonneted lamps coming into vogue that colliers' eyes suffered to a greater extent from the Stephenson lamp (which had a cylindrical glass inside the gauze) than from the naked Davy with a two-thirds tin shield. A naked Davy lamp light is photometrically only equal to one-seventh of a Marsaut lamp, and therefore, if eye diseases are caused by want of light, miners of old would have suffered very severely. As they did not so suffer, there must be some other cause to account for the disease which no one can doubt, after reading Dr. Court's report, exists in a very marked degree among persons using bonneted lamps.

"To sum up Dr. Snell's opinion and the facts now added, it would appear to be obvious that, if a modern safety lamp is made to give an increased illumination and also to shield the eyes of the workmen from the glass glare or reflected light, a remedy will have been found for what appears to be a very serious and growing evil."

The German Ultramarine Industry.—The low prices of ultramarine which have held for more than 10 years have led to the formation of a limited liability company which has taken over nearly all the ultramarine works of Germany. Arrangements have been made with the few works that have not joined this company by which either the whole of their make is sold to the company, or some other device has been agreed upon which gives a guarantee that the operations of the new company will not be interfered with. A consequence of this combination has been a considerable rise in the price of ultramarine.

Test of Harvey Steel Armor Plates.—Further armor trials have just been concluded at the naval ordnance proving ground at Annapolis, and the results are said to be fully as important as those of any in the series being made for the development of American armor plates. The object of the last test was to show what could be done with all-steel plates containing a very low proportion of carbon and treated by the Harvey process. In the last previous trial it had been found that all-steel plates of higher carbon treated by this process had a tendency to crack under the impact of the shots. Two plates were ordered from Carnegie, Phipps & Co., each containing but 0·25% of carbon. They were treated by the Harvey process at the Washington Navy Yard. Like the last plates tested, they were 3 in. in thickness and were attacked with a six-pounder Hotchkiss, firing the best quality of forged-steel projectiles at 1,811 ft. initial velocity, giving them striking energy enough to pierce a plate of ordinary steel 4 in. thick. Fourteen projectiles were fired at each plate, each of which was shattered upon striking the plate, the latter being practically uninjured. The results compared very favorably with the nickel-steel plate, treated by the Harvey process and tested at the last trial.

The Electrolysis of Sulphuric Acid.—The new peroxide of sulphur, SO_4, says Prof. Traube, of Breslau, is obtained when solutions of sulphuric acid containing at least 40% of acid are subjected to electrolysis, as a crystalline deposit upon the anode. The crystals were first observed some time ago by Berthelot, but were considered by him as identical with the oxide S_2O_7, which he had previously obtained by the action of the silent electrical discharge upon a mixture of sulphur dioxide and oxygen. It is found by Prof. Traube, however, that the substance obtained at the anode in the electrolysis of 40% solutions of sulphuric acid is represented by the formula SO_4, and is quite a different substance from Berthelot's S_2O_7. However, in spite of its ready decomposition into oxygen and sulphuric anhydride, SO_4 is but a weak oxidizing agent. But under certain circumstances it acts as a powerful reducing agent. For instance, if an emulsion of peroxide of lead in 40% sulphuric acid is brought in contact with a quantity of similar acid which has been subjected to electrolysis so as to charge it with SO_4, rapid evolution of oxygen gas occurs, and the peroxide of lead is converted into ordinary sulphate of lead. Prof. Traube regards sulphur peroxide as built up on the type SO_3 (O_3), resembling hydrogen peroxide, H_2O_2. He considers that Berthelot's oxide, S_2O_7, is a molecular compound of SO_3 and SO_4, for it does not dissolve in water without decomposition, breaking up into sulphuric anhydride and oxygen, which is evolved. On the other hand, it appears, like SO_4, to be perfectly stable in a moderately concentrated solution of sulphuric acid.

The Coloring Matter of Ultramarine.—Ultramarine has long been a chemical puzzle, alike in its constitution, the cause of its color, and the vicissitudes of its manufacture, but now at least there is reason to suppose that one of these questions is in a fair way to be definitely solved, says *Industries*. Some time ago it was suggested that the color of ultramarine was due to the presence of an allotropic modification of the element sulphur, a substance capable of many vagaries. Mr. F. Krapp has recently pursued the former line of inquiry by investigating the so-called "black sulphur" of Magnus, which he finds to be not sulphur only, but a mixture of a certain modification of sulphur with a compound containing both sulphur and carbon. This modified form of sulphur by mere subdivision gives a blue color to the substance used to subdivide it, and there appears to be little doubt that ultramarine simply consists of a basis of colorless silicates impregnated with blue sulphur, resulting from the sodium sulphide formed in the ordinary course of manufacture. As blue sulphur in a state of isolation is unstable, and quickly passes into the yellow variety, it is easy to understand that on decomposing the colorless "base" by means of an acid the sulphur itself undergoes change, and ultramarine as a pigment ceases to exist. Mr. Krapp suggests that this same modified form of sulphur may play a part in the production of vulcanite, and that the blue color of certain blast-furnace slags may be due to it. In any case sulphur which boils at a temperature far above 440 C., whose vapor is colorless, which oxidizes to sulphur dioxide without visible combustion, and which itself is moreover blue, is a body sufficiently remarkable to warrant further research.

PATENTS GRANTED BY THE UNITED STATES PATENT OFFICE.

The following is a list of the patents relating to mining, metallurgy, and kindred subjects issued by the United States Patent Office.

TUESDAY, JULY 14th, 1891.

455,805 Steam Boiler. William W. Sutcliffe, New Orleans, La.

455,808. 455,809. Electro-magnetic Ore Separator. Jonas Wenstrom, Orebro, Sweden, Assignor by direct assignments of two-thirts to Olof Wenstrom and William W. Manning, Marquette, Mich.

455,824. Mining Machine. Horace B. Wyman, Dover, N. H., Assignor to the Thomson-Van Depoele Electric Mining Company, of Maine.

455,963. Rock Drill. Rufus A. Farrar, New York, N. Y., Assignor of one-half t c Edward W. Tingue, same place.

455,984. 455,985. Magnetic Separator. Henry G. Fiske, New York, N. Y., Assigno to John D. Cheever, same place.

456,111 Apparatus for Effecting the Admixture of Oil, Air and Steam, and for in jecting the same into furnaces or retorts. John Burns, Rochester, As signor of one-half to John H. Reynolds, Troy, N. Y.

PERSONALS.

Mr. Leonard Lewissohn, of New York, has gone to Europe. He will return during the latter part of August.

Mr. E. H. Dewey, of Silver City, Idaho, has been appointed superintendent of the Trade Dollar mines, located at that place.

Mr. Charles H.Taylor, of the mining firm of Taylor & Rathvon, Denver, Colo., is making a short visit at Winthrop Beach, near Boston, Mass.

The resignation of George S. Rice, deputy chief engineer, was accepted by the Aqueduct Commissioners of this city, on the 15th inst., and the office was abolished.

Mr. W. M. McMechen, formerly superintendent of the Ground Hog mine at Red Cliff, Colo., has accepted a position in the office of Taylor & Rathvon, Denver.

Mr. Daniel Kirby, formerly with the Ute and Ulay Mines, Limited, of Lake City, Colo., is in charge of the interests of Messrs. Posey & Crawford, at Rico, Colo.

The special commission appointed to select a site for a new mint has organized by the election of Ex-Mayor Fitler, of Philadelphia, as president, and Colonel Bosbyshell, secretary.

Mr. George P. Dravo, of Pittsburgh, Pa., has gone to Utah to manage the Wasatch Reduction Company, which is to operate the Eureka works, at West Jordan, by the Meech process.

Mr. N. Treweek, manager of the Niagara Mining and Smelting Company, of Bingham, Utah, has returned to Salt Lake City from an extended trip through the East, where he has been on business of the company.

Mr. Samuel James, who has been for some time past with the Globe Smelting Company, of Denver, Colo., has been appointed manager of the smelting works of the Pioche Mining and Reduction Company, at Pioche, Nev.

Capt. Geo. A. Jackson, who promoted the sale of the Sampson group, in the San Juan district of Colorado, recently, and is largely interested in the Saratoga Mining and Milling Co., operating near Ironton, is to manage both properties.

Mr. J. N. Porter, of Stambaugh, Mich., has resigned the general management of the Florence-Iron River Company's properties, located at the Menominee Range, in Michigan and Wisconsin. He takes the superintendency of gold and silver mine in Colorado.

Mr. Richard E. Chism, M. E., editor of *El Minero Mexicano*, has passed the examination of the National School of Mines of Mexico, and has been awarded its diploma. As a graduate of the school he is enabled to act as a mining expert in conformity with the Mexican laws.

Samuel A. Rose, who has for some years been connected with the blooming mill department of the Edgar Thompson Steel Works of Carnegie Bros. & Co., Limited, at Braddock, Pa., has resigned his position, in order to accept a position with the Robert W. Hunt & Co. Bureau of Inspection, Chicago.

Mr. James Dredge, editor of *Engineering*, and one of the members of the Royal Commission to the World's Fair at Chicago, entertained the members of the American Foreign Commission at dinner last week. Mr. Dredge will soon visit the United States on business connected with the English exhibit.

Dr. Charles J. Eames, of New York City, who has established himself at San Diego, Cal., for the purpose of building an iron plant, was thrown from his buggy on the 4th inst. and sustained serious injury. At the time of the accident Dr. Eames was on his way from Julian, where he had been examining the iron deposits. The $200,000 subsidy referred to in the ENGINEERING AND MINING JOURNAL, July 11th, which is to be granted for the new iron plant at San Diego, has been nearly all raised. We trust that Dr. Eames may succeed better in his California scheme, where the conditions appear unusually favorable, than he has done in his many unsuccessful enterprises here in the East.

OBITUARY.

Thomas E. Belden, of Meriden, Conn., who died recently at the age of 77, was one of the Argonauts of 1849. He was one of the first to leave Connecticut, his native State, and go to California in search of gold. Like many others, he returned poor. He amassed a comfortable fortune afterward by thrift and industry.

Edward Burgess, A. M., the famous naval architect, died from typhoid fever at his residence in Boston, Mass., on the 12th inst. He was born at West Sandwich, Mass., in 1848, graduated from Harvard in 1871. He was Secretary of the Society of Natural History of Boston for eighteen years, and was for several years instructor in entomology at Harvard, his increasing business in yacht designing finally compelling him to resign that place.

Daniel Bushnell, who died in Pittsburg, Pa., on the 12th inst., was born in New York City, in 1808, and removed with his father to Pittsburg in 1813. He was one of the pioneers in the coal business, and is said to have been the first to suggest the transportation of coal down the Ohio River by means of steamboats. He was also the first, in connection with J. J. Vandergrift, to take oil in bulk from Venango County down the Allegheny River to Pittsburg.

INDUSTRIAL NOTES.

The Duquesne Steel Works at Pittsburg, Pa., were started on the 16th inst.

The Thomas Iron Company's furnace at Hellertown, Pa., is being filled preparatory for a run.

The Neville direct process has been started by the Harriman Wrought-Iron Company at Harriman, Pa.

The Piqua Rolling Mill, in Piqua, O., has signed the scale of the Amalgamated Association, and work has been resumed.

The lake steamer Pontiac, loaded with iron ore, was run into by the steamer Athabasca and sunk at Sault Ste. Marie, Mich. Loss $200,000.

The 800 employés of the Valley Nail Mill and the Waugh street plant in Belleville, Ill., who went on strike for the Columbus scale, have returned to work.

The Ellis & Lessig's Iron Works' plate mill, in Pottstown, Pa., will resume work on the 20th inst., and the nail factory on the 21st inst., according to press dispatches.

Messrs. W. and J. Warren, of Denver, Colo., are making preparations for the erection of pottery works at Argo, Colo. Colorado kaolin, flint and feldspar will be used.

The Tonawanda Iron and Steel Company's plant at Tonawanda, N. Y., was badly damaged by fire on the 10th inst., and will have to be shut down for three or four weeks. The damage is estimated at $20,000, fully covered by insurance.

David James, of Salt Lake City, has purchased the lead pipe plant of the Germania Lead Works of that place and is equipping new works in the northern part of the city. The local consumption of lead pipe is about 45 tons per month.

It is said that a party of Philadelphia capitalists, among them Mr. Albert Murphy, of the Consho hocken Tube Works, of Pennsylvania, will shortly visit Duluth, Minn., and vicinity, with a view to establishing tube works in that territory.

It is said that the Cambria Iron Company's store at Johnstown, Pa., is about to be sold to a firm of capitalists. The money involved in the transaction will reach nearly $1,000,000. The sale is to be made because of the new state law against company stores, which is to go into effect August 1st.

Among the iron works which recently signed the Amalgamated scale are the Youngstown Iron and Steel Company, of Girard, O.; Junction Iron and Steel Company, of Mingo Junction, O.; the Etna Iron Company, of New Castle, Pa., and the Mitchell-Tranor Company, of Covington, Ky.

The Lehigh Valley Railroad Company has commenced handling coal by steam power at its new stocking grounds at South Plainfield, N. J. A 30-ton car was discharged in 8 minutes by green hands. The storage capacity of the grounds is 310,000 tons, which will probably be increased to 1,000,000.

At a meeting of table glassware manufacturers of Pennsylvania, Ohio and West Virginia, held on the 15th inst., in Pittsburg, the plants were consolidated and an association formed under the name of the United States Glass Company. D. C. Ripley, of Pittsburg, was elected president. The company comprises 13 firms, with a capital of $1,000,000.

The Standard Chemical Company has been organized with a capital of $1,000,000 in shares of $100 each, to manufacture a material called "quickine," which is claimed to be superior to quinine and antipyrine. The office of the company is at 90-92 Broadway, New York, and its works in Jersey City. Mr. Geo. W. Dunn is president of the company.

The Spang Steel and Iron Company, of Pennsylvania, according to the Pittsburg *Chronicle*, has been reorganized with a capital of $1,000,000. The company has about perfected plans for the erection of a new plant at Pittsburg, Pa., for the manufacture of sheet steel. The new mill, which will be adjacent to the present works, will have a capacity of from 25 to 40 tons per day, employing 60 men.

The Babcock & Wilcox Company, of New York, advises us that Mr. L. Moyes, formerly agent of this company, at No. 32 North Fifth street, Philadelphia, has surrendered the charge of the office and business at that point to the new agents, Messrs. W. C. Temple and Henry F. De Puy. The company requests that any business which is to be transacted with the Philadelphia office be done through either of these gentlemen.

The Pennsylvania Bolt and Nut Work's 10-inch mill, at Lebanon, Pa., started on the 13th inst. and the 8-inch mill on the 15th with a full complement of workmen, all of whom are non-union men except two. The company has all along refused to sign the scale, and still says that it will not do so under any circumstances. The company claims that when it becomes necessary to start the 16-in. mills it can find the necessary men.

The Chicago Iron Works, Chicago, Ill. (a corporation organized under the laws of the State of Illinois) announces that it has acquired all the property, business, and good-will of the firm of Gail, Bumiller & Unzicker. The members of the old firm will continue with the business as heretofore, and will act for the new company—Mr. Gail as president, Mr. Bumiller as vice-president and treasurer, and Mr. Unzicker as general manager and secretary.

A dispatch from Amsterdam states: A proposal to grant the Standard Oil Company a 10 years' lease of sites at Rotterdam and Antwerp for the erection of oil tanks has been discussed by the municipal authorites. The *Chambre de Commerce et Fabriques* supported the proposal. Several commercial houses presented a petition in favor of the rejection of the proposal on the ground that the lease would assist the Standard Oil monopoly and prove injurious to retailers and general consumers. The Council rejected the motion for a temporary refusal of the grant and postponed decision on the main question.

The Worcester, Mass., Steel Works' creditors, it is said, have consented to accept a compromise, and the works will soon be running again. The indebtedness is about $1,200,000, of which the president, George M. Rice, of Worcester, has a claim of $575,000 for indorsed paper. He offers to relinquish this claim, and outside parties will put up $200,000, which will give the creditors a dividend of about 33%. Then additional capital to the amount of $600,000 will be subscribed, and the manufacture of merchant steel will be resumed. The plant has recently been appraised at $943,000, and is one of the finest in New England. The concern was dragged down by the Potter-Lovell failure.

The National Tube Works Company, of McKeesport, Pa., is to be reorganized under the laws of New Jersey. The new company will include, besides the National Tube Works Company, the Monongahela Furnace Company, the Republican Iron Works, and the Boston Iron and Steel Company, all of which have been formed by the National Tube Works Company. The capital of the new company will be $11,500,000. One-half will be 7 per cent. preferred accumulative stock and the remainder common stock. The capital of $11,500,000 represents the value of the various plants as agreed on by the Reorganization Committee in addition to the surplus of each company, divided approximately as follows: National Tube Works Company, $9,000,000; Monongahela Furnace Company, $550,000; Republican Iron Works, $1,000,000, and Boston Iron and Steel Company, $950,000. The annual output of the new company will be about $15,000,000.

The Westinghouse Electric and Manufacturing Company's shareholders, at their meeting on the 15th inst, unanimously decided to accept the plan of reorganization recently proposed. The following new Board of Directors was elected: Charles Francis Adams, Boston; Lemuel Bannister and A. M. Byers, of Pittsburg; August Belmont, Charles Fairchild, Marcellus Hartley, George W. Hebard, Henry B. Hyde and Brayton Ives, of New York, and George Westinghouse, Jr., Pittsburg. By the plan of reorganization $4,000,000 of 7% cumulative preferred stock is created, of which $3,000,000 has been taken at par by the reorganization syndicate to care for the company's floating debt and provide additional capital. The assenting stockholders give up 40% of their stock, aggregating over $2,500,000 par value, for the use of the company, and receive upon the 60% of stock which they retain a 7% preference over the small amount of non-assenting stock remaining out.

Nimick & Co., of Pittsburg, Pa., dealers in pig iron, whose proposed liquidation was reported on the 14th inst., is composed of Alexander Nimick, John S. Slagle and George P. McBryde. Mr. Nimick, who has been for half a century prominent in the business interests of Pittsburg, is the principal partner. The firm's creditors have agreed to an extension, the terms of which will be arranged in a few days, avoiding the necessity of an assignment by enabling the firm to meet its obligations without sacrificing its assets. The liabilities are placed at $1,000,000, and the assets, including Mr. Nimick's personal estate, at $1,700,000. The firm was organized by Mr. Nimick over 45 years ago, and is one of the oldest in the metal trade. It has at different times owned and operated blast furnaces in various parts of the country about Pittsburg, and it has been a large purchaser of the product of other furnaces. At present it operates the plant of the Charlotte Furnace Company in Fayette County, Pa., and the Kemble Iron Company's furnaces in Bedford County, Pa. These properties, on account of their situation and local complications, have been for some time past unprofitable. The Kemble plant has occasioned particularly heavy losses. The firm has also suffered

severe losses through acceptances which have shrunk in value.

Proposals for entering into one of the largest contracts awarded by the War Department in recent years were opened on the 13th inst., in the office of Gen. Flagler, Chief of Ordnance. They were in response to advertisements inviting bids for building twenty-five 8-in., fifty 10-in. and twenty-five 12-in. breech loading, rifled, built-up steel guns.

The proposals received were as follows:

Midvale Steel Company.—One 8-in. type gun, with ammunition for testing, $22,028, to be delivered in three years; 25 service guns of the same pattern at the same price each, to be delivered in eight years after acceptance of the type gun; one 10-in. type gun, $51,880, and 49 service guns at same price each, to be delivered in eight years; one 12-in. type gun, with ammunition, $88,592, and 24 service guns at the same price each, to be delivered in eight years.

South Boston Iron Works—One 8-inch gun, $27,300; 350 rounds of ammunition, $24,332; 24 service guns, $20,695 each, deliveries to begin in 1894 and to be made at the rate of 6 per year; 1 10-inch type gun, $60,560; ammunition for the same, $43,350; 49 service guns, $47,700 each, to be delivered 5 each year after 1895; 12-inch type gun, $100,000; ammunition for same, $60,000; 25 service guns, with 10 rounds of ammunition, $79,500 each, to be delivered 5 each year after 1896.

Bethlehem Steel Company—Eight-inch type gun, $48,893, delivered in 1,460 days, and $42,035 if delivered in 2,190 days; 24 service guns of same kind at $19,723 each delivered in 552 days, or $17,246 if delivered in 730 days; 10-inch type gun, $78,937 delivered in 699 days, or $73,755 delivered in 882 days; 49 service guns of this size at $40,929 each delivered in 2,130 days, or $37,754 delivered in 3,404 days; 12-inch type gun, $113,951 delivered in 791 days, or $106,558 delivered in 1,095 days; 24 service guns at $61,846 each delivered in 2,038 days, or $54,473 delivered in 3,194 days.

The Bethlehem bid was accompanied by some conditions, one looking to a change in the proportions of the hoops of the guns and another to allowance for advanced deliveries. The act of Congress gives authority to divide the awards, but at their longest periods of time the Bethlehem bids are still the lowest in each class, and their lowest total of $3,785,850 for the 100 guns is the only one within ths limit of the appropriation ($4,255,000). The total of the Midvale bid is $5,359,500, and the South Boston bid $5,174,312.

MACHINERY AND SUPPLIES WANTED AT HOME AND ABROAD.

If any one wanting Machinery or Supplies of any kind will notify the "Engineering and Mining Journal" of what he needs, his "Want" will be published in this column.

Any manufacturer or dealer wishing to communicate with the parties whose wants are given in this column can obtain their addresses from this office. No charge will be made for these services.

We also offer our services to foreign correspondents who desire to purchase American goods, and shall be pleased to furnish them information concerning American goods of any kind, and forward them catalogues and discounts of manufacturers in each line, thus enabling the purchaser to select the most suitable articles before ordering.

These services are rendered gratuitously in the interest of the subscribers and advertisers; the proprietors of the "Engineering and Mining Journal" are not brokers or exporters, nor have they any pecuniary interest in buying or selling goods of any kind.

GOODS WANTED AT HOME.

2,318. An entire outfit for mining "earth pebble phosphates." Alabama.

2,319.—Twelve-lb. steel rails for eight miles of track; also locomotive and 4 or 6 cars for track 36 inches gauge, all for logging purposes. Virginia.

2,320. Machinery for mining pebble phosphates on a large scale. Florida.

2,322. Twelve miles of 50-lb. rails and two miles of light T-rails, with joints, spikes, etc., sufficient to lay same. Florida.

2,323. Three locomotive, six horse, four gondola and ten mine dump cars. Florida.

2,324. Roofing, either steel or tin. South Caroliana.

2,325. An anti-freezing force pump. Montana.

2,326. An elevator for a tobacco company. North Carolina.

2,327. Dynamo of not less than 500 candlepower, and also an engine of about 100 horsepower early in the fall. Georgia.

2,328. A heading, turning lathe and crossing machine. Georgia.

2,329. Assayers' goods. New Mexico.

2,330. Wanted, the address of the manufacturer of the Vapart centrifugal disintegrator. New York.

AMERICAN GOODS WANTED ABROAD.

2,313. A prominent importing firm which has been established in Peru 30 years, and has large business connections along the coast wishes to communicate with manufacturers who desire to extend trade in that country in the following articles: Rifles, revolvers, ammunition, dynamite, baby carriages, baking powder, balances, brooms, salmon, chairs, electric bells and lamps, St. Louis beer, furniture, latest invention in economical gas burners, gold pens, first-class gold-plated jewelry, kerosene and gas lamps, lard, lumber, hardware, harmoniums or rather organs, ice cream machines, electroplated goods, nail pullers, novelties, pencils, printer's inks, saddlery, rubber clothing, perfumery, windmills, blue drills, denims, Shetucket stripes, Indian Head shirtings, twilled gray cottons and shirtings, cooking stoves, ready-made shirts, sawing machines, traveling trunks, and whiskey. Peru.

2,321. Furnace using gaseous fuel for the reduction of tin ore. Peru.

GENERAL MINING NEWS.

A party of eight men left Denver on the 6th inst. to explore the cañon of the Colorado River for mineral deposits. The party is sent by the Colorado Grand Cañon Mining and Improvement Company, which has ventured $15,000 in the enterprise. The party is led by Harry McDonald, an experienced prospector, who was guide of the ill-fated Brown party which went down the cañon in 1889.

TENNESSEE COAL, IRON AND RAILROAD COMPANY.—It is reported that this company has successfully utilized the gases emitted in the process of coking under the boilers at the works at Tracy City, Tenn. The gases pass by suitable flues to the boilers and the result has been "a no less satisfactory product of coke and a decided fuel economy."

ALABAMA.

It is reported from Florence, Ala., that the property of the Sheffield Land Company and the plant of the Alabama Iron and Railway Company, of Sheffield, will be sold to an English syndicate. Negotiations have been pending for some time, and it is now said the deal will be closed on the arrival of the principal owners, Messrs. Ensley and Cole, who sailed for London on the 10th inst. The property consists of three blast furnaces which have never cast a pig of iron, and nearly two-thirds of the town of Sheffield. The price is understood to be $3,000,000.

ALASKA.

ALASKA TREADWELL GOLD MINING COMPANY.—This company has declared its quarterly dividend of 37½c. per share, amounting to $90,000, payable on the 15th inst.

ARIZONA.

COCHISE COUNTY.

COPPER QUEEN CONSOLIDATED MINING COMPANY.—The company is mining between 300 and 400 tons of copper ore daily. About 200 men are employed in the mine, and 200 in the smelter and surface works. The company recently purchased the Neptune group of mines, and is now developing them.

MARICOPA COUNTY.

A large onyx quarry is being opened on Cave Creek, 18 miles from Phœnix. The quality of the stone is said to equal the Mexican variety.

YAVAPAI COUNTY.

CROWNED KING MINING COMPANY.—The result of a recent clean up of this company was a gold bar valued at $12,000. In addition, a considerable amount of concentrates, valued at $397.26 per ton, has been shipped. Additional concentrators will be put in at the mill.

CALIFORNIA.

The receipts of quicksilver at San Francisco from California mines in June and for the first six months of the year compare as follows:

	For June.	Jan. 1 to June 30.
1889, flasks	1,573	8,205
1890	885	6,025
1891	891	7,044

The exports by water from San Francisco for the first six months of the year were as follows:

	Flasks.	Value.
Mexico	1,721	$78,395
Japan	80	3,753
New Zealand	170	6,999
Central America	88	3,760
British Columbia	3	149
Total	2,062	$93,056
In 1890	1,801	90,266

AMADOR COUNTY.

(From our Special Correspondent.)

KENNEDY MILLING AND MINING COMPANY.—Many improvements have recently been made in the working plant of the mine and mill. The machinery in hoisting works and mill is run altogether by water power. There are, however, two 40 horse power steam engines, one at each shaft, so connected that in case of a break in the ditch, or any other accident, work could be continued without delay. Seven Pelton water wheels are in use. One 6-ft. wheel operates the stamps, and the 4-ft. wheel the concentrators. When the mill is running 340 inches of water are used, the water being supplied by the Blue Lakes Water Company. The mill has 40 stamps, each weighing 850 pounds, and works 2¼ tons per stamp every 24 hours. To each five stamps there are two Frue concentrators, or 16 in all. The mine is opened by two shafts, 550 ft. apart, one near the south line and the other 850 ft. north of the south line. The greatest depth obtained is 1,375 ft., both shafts being connected at the 1,250 level. The lode occurs between formations of slate and green stone or diorite. The quartz contains about 1½% to 2% of sulphurets, assaying $135 per ton. The vein varies in width from 2 ft. to 40 ft., the ore becoming better in quality and the chutes larger as depth is attained, this latter being the characteristic of the mother lode. While the company has every convenience for handling water, which averages 75,000 gallons daily, no pump is used, water skips of 550 gallons being preferred. No timber is found in the immediate vicinity, but has to be brought over a distance of 20 miles. Dividends are now, and have been for some little time, being paid by the company with regularity. Quite recently, the company erected chlorination works with a capacity for handling 3 tons of sulphurets per day. The Plattner system is followed.

CALAVERAS COUNTY.

UNION.—It is rumored that this mine has been purchased by a New York syndicate, and that all the copper mines of this district, which excited so much attention in 1860, will be worked again.

PLUMAS COUNTY.

INDIAN VALLEY.—Work has been resumed in this mine.

MONO COUNTY.

BULWER CONSOLIDATED MINING COMPANY.—The ore body, which is being stoped from No. 10 raise above the 200 level, is 7 ft. wide and the ore of excellent grade. About 19 tons of ore are being crushed per 24 hours at the Bodie mill. Last battery samples assayed $32.32 per ton and tailings $4.41.

SAN BERNARDINO COUNTY.

(From our Special Correspondent.)

CARBONATE MINING COMPANY—Papers in two suits instituted against the company have been filed in the United States Circuit Court. The actions were originally instituted in San Bernardino to recover $50,000 damages alleged to have been sustained by the plaintiffs, who claim title to 80 acres, by reason of unlawful entry thereon by the defendant. The latter claims that the location was made in January, 1889, and that $10,000 was expended in developing the claim, and that last April it succeeded to the title, thus having priority. The Carbonate mine, situated on the land in dispute, is near Oro Grande and contains ore which shows a remarkable proportion of free gold.

COLORADO.

Mineral surveys approved by the United States Surveyor-General of Colorado, during the week ending July 11th, 1891; Survey number, 6,740; land district, Leadville; name of claim, Jersey Girl Lode. No. 6,945, Leadville; Sliver, Iroquois Strip and Ridge Lodes. No. 6,962, Central City, White Metal Lode. No. 6,802, Central City and Leadville, El Montana Lode.

ROCKY MOUNTAIN OIL COMPANY.—Arrangements have been completed for the building of the refinery at Overton, a suburb of Pueblo. The plant will cost $500,000, and work will be commenced at once. The entire product of the company's oil wells at Florence will be refined there, the crude oil being conveyed to the works by the pipe line already under construction. The enterprise will give employment to a large number of men.

BOULDER COUNTY.

INGRAM MINING COMPANY.—The Carpet-Bagger shaft was sunk into the workings of this company last week. A lawsuit was instituted some time ago by the Carpet-Bagger people against the company, in which they claimed that the latter was trespassing on their ground.

CLEAR CREEK COUNTY.

BALMORAL MINING COMPANY.—J. W. Edwards has brought suit in the United States Court against this company for $100,000. The allegation is that the defendant company's Dove Nest lode has trespassed upon the territory of the Comstock lode, belonging to the plaintiff. The suit, says the Georgetown *Courier*, is a counterpart to the injunction suit recently brought by lessees of the Comstock against the Balmoral people.

CHAFFEE COUNTY.

LADY MURPHY MINING COMPANY.—The ore body recently opened by lessees is said to have been exposed for 85 ft. and is 14 ft. wide, about one-half of the ore being of shipping grade. The first 40 tons shipped returned over $1,400.

CUSTER COUNTY.

PHŒNIX LEAD COMPANY.—The lessees have sunk another winze from the lowest level of the Bull-Domingo mine, and have opened the best bodies of ore yet uncovered in the property, according to local reports.

JEFFERSON COUNTY.

DENVER NATURAL GAS AND OIL COMPANY.—A new contract to sink the well has been let and work was commenced on the 25th ult.

LAKE COUNTY.

ARKANSAS VALLEY SMELTING COMPANY.—The company is reconstructing its blast furnaces and furnace building.

BANKOK-CORA-BELLE MINING COMPANY.—Receipts for June were $194.60; disbursements on account of new shaft, $1,200; funds on hand July 1st, $9,076.24.

WHITE CAP.—An output of 60 tons per day of lead carbonate ore of excellent grade is being made.

OURAY COUNTY.

AMERICAN BELLE MINES, LIMITED.—The Hudon mine has been closed down pending the erecon of the Durango smelter.

GENESSEE-VANDERBILT MINING COMPANY.—A new body of galena and gray copper ore assaying high in lead and fair in silver was cut by the new tunnel last week. It is expected that the tunnel will cut the Genessee vein and connect with the shaft during the present week.

PARK COUNTY.

LAST CHANCE MINING COMPANY.—This company has sold the Only Chance mine at Horseshoe to the Globe Smelting and Refining Company of Denver. The mine produces lead carbonate ore of good grade.

PITKIN COUNTY.

Aspen ore shipments for June amounted to 10,279 tons.

LITTLE ANNIE MINING COMPANY.—The experiments in dressing the low-grade ore from the dumps of this company, conducted in the Mollie Gibson mill, were successful. There is said to be 5,000 tons of ore on the Little Annie dump which will assay 12 ozs. to 18 ozs. of silver per ton.

PUEBLO COUNTY.

The mineral palace at Pueblo was opened on the 4th inst. The exhibition is one of the most interesting ever held in Colorado.

SAN MIGUEL COUNTY.

SMUGGLER-UNION MINING COMPANY.—This company was incorporated in Denver on the 30th ult., being a consolidation of the Smuggler Mining and Milling Company and the Union Consolidated Mining Company, the shareholders of which had agreed to the step at their meeting on the previous day. The capital of the new company is $500,000, and the directors are John A. Porter, James B. Grant, Richard Pearce, William A. Bell, A. H. Fowler, J. H. Pullen, and Anton Ellers.

SUMMIT COUNTY.

PENNSYLVANIA MINING COMPANY.—The company is making an output of 100 tons per month. The vein has been cut by three tunnels, each showing a good breast of galena ore.

IDAHO.

BOISE COUNTY.

GOLD HILL MINING COMPANY.—Some very rich gold ore is said to have been opened on the lower level of the Pioneer mine at Quartsburg. The mine has been doing well hitherto and the monthly profits of the company are estimated at between $5,000 and $15,000.

IDAHO COUNTY

About 50 men are now employed in the quartz mines of Warren, and considerable machinery will be shipped in this season, which, when in operation, will give employment to many more. There are now three five-stamp mills in active operation; one on the Mayflower, one on the Knott and one on the Little Giant. Besides these there is an arrastra on the Scott mine and one on the Keystone.

OWYHEE COUNTY.

DE LAMAR MINING COMPANY, LIMITED.—The work of doubling the size and capacity of this company's present mill was begun on the 6th inst. The creek will be cribbed and substantially bridged. A large Corliss engine will be located close to the creek bank. New batteries and twice the number of pans and settlers will be employed in the reconstructed mill. It is proposed to complete this work in 90 days, during which time the present mill will be kept running. A new ten-stamp battery, with 950-lb. stamps and double discharge, will be placed beside the present battery. A new battery of boilers will be put in. The capacity of the remodeled mill will be about 80 tons per day. The plans and specifications are also being prepared for a larger mill, which will be built between the two gulches which come into the creek below the present mill, which will probably be built before many months. This will be run by water power supplied by the 4-mile ditch now being built, which will take the water of Jordan Creek far enough up the side of the mountain to give a fall of upward of 400 ft.

ORO FINO MINING COMPANY.—Mr. M. T. Leech, superintendent of this company, reports that it is doing considerable development work in the mine, and has opened enough ore to keep the Lincoln mill, which has a capacity of crushing about 40 tons per day, running steadily. No ore is being produced, however, on account of trouble between the company and the former owner of the property.

TRADE DOLLAR.—This group at Silver City, including the Trade Dollar, Jim Blaine, Black Bart, and Allegheny mines, has been sold to a Kentucky company by W. H. Dewey.

WASHINGTON COUNTY.

The wagon road from Boise and Weiser into the Seven Devils District is completed, and considerable quantities of freight and machinery are being orwarded to the mines over it.

KANSAS.

A special report shows that during the week ending July 11th, the output of ore from the mining districts of Galena and Empire City was: Rough ore, pounds milled, 1,817,320; rough ore, pounds sold, 1,205,755; zinc ore, pounds sold, 983,890; lead ore, pounds sold, 120,000; sales aggregated a total value of $13,824.

KENTUCKY.

BELL COUNTY.

PINE MOUNTAIN COAL AND IRON COMPANY.—A syndicate, with headquarters at Minneapolis, Minn., is reported to have purchased the property of this company for $1,000,000.

MAINE.

The granite-quarrying companies of this State have been asked to furnish the stone for the Maine building at the World's Fair at Chicago. From the responses already received it is thought that all the material needed will be donated.

MICHIGAN.

COPPER.

Reports from the Lake country are to the effect that an almost unparalleled drought prevails. The water in Lake Superior is 14 ins. lower than usual. The Atlantic stamp mill, which, although located on Portage Lake, derives its water supply from streams, has been compelled to shut down one of its five head of stamps. The Allouez, as noted elsewhere, is idle. The Central and other inland mills are also troubled.

We have been informed through what we consider entirely reliable sources that a deal has been made by which the control of the Franklin as well as the Huron mining companies has passed into the hands of the Clark-Bigelow-Lewissohn party. While details are not at present given for publication, the Messrs. Lewissohn so far confirm this report as to inform us that they have been appointed copper sales agents of the Franklin and Huron mining companies. As is well known, the St. Mary's Mineral Land and Canal Company, which owns several tracts of mineral land adjoining the Franklin on the west, is practically controlled by Messrs. Clark and Bigelow. The Franklin lode, which dips through this property, is worked to within a short distance thereof. The great expense which would be necessitated by the separate working of the property has thus far deterred the canal company from its development. Now that the Franklin's days are numbered, it is probable that this reported change in control contemplates a consolidation of the several interests. A large block of Huron Mining Company's stock has been in the possession of the Lewissohns for over a year. The property is still in the hands of creditors, and we are informed by a gentleman conversant with its affairs that the Houghton National Bank is advancing the money to meet labor bills in order that available ore can be extracted and stamped. The proceeds, after paying the loan, are to go the creditors. Tnere is sufficient material of this kind to keep the property in operation two or three months, after which time it will probably be closed. The mine, as is well known, is in bad shape for operation, both on account of its development and equipment. It is the belief of prominent copper mining men that the investment of a considerable sum of money and some work will be necessary before it can be operated to any advantage.

ATLANTIC MINING COMPANY.—A dam is being built at the forks of Cowles Creek to increase the water supply for the mill. The new engine-house at No. 2 shaft is well along toward completion.

ALLOUEZ MINING COMPANY.—The stamp mill has been closed owing to a scarcity of water; 200 men are out of work in consequence.

CENTRAL MINING COMPANY.—This company's June product was 65 tons of mineral. Total for first six months of year, 365 tons, against 438 tons, corresponding period last year.

COPPER FALLS MINING COMPANY.—The mineral product in June was 76 tons.

WOLVERINE MINING COMPANY.—Mr. John Stanton has issued the following statement of the affairs of this company. Receipts to May 31—Working capital fund, $50,000; interest, $767.75; total, $50,767.75. Expenditures to May 31 were $50,293.06, leaving a balance of $474.69; of the expenditures $47,743.18 were at the mine, and $2,549.88 in New York. Assets, May 31, were $13,344.47, and liabilities $12,869.78. Upon taking possession of the property in August last, the former openings were found to be in bad condition and extensively caved in, and more time and money have been consumed in putting the mine in working order than was anticipated. It has been necessary to timber and secure the old workings, repair the hoisting and other machinery and buildings, provide additional boiler power, new pumps, mine cars and tracks in the mine, a complete outfit of power drills and other mine tools, air pipe, etc., also shop tools for repairing tools and machinery. The stamp mill has also required extensive repairs, and the dam which holds a reservoir of water for the mill has been rebuilt and enlarged. Openings have been as follows: drifting on second level 517 ft.; third level 488 ft.; fourth level 132 ft. and fifth level 595 ft. No. 2 shaft is now sinking below the fifth level, and sinking of a new shaft, No. 3, has been begun from the surface in order to command the good ground now exposed and opening in the second level south. The drifts have passed through quite an amount of promising copper ground, but no stoping has been done as yet. It is believed that as soon as the mill is ready for work it can be fully supplied with pay rock. A further call of 50 cents per share, payable Aug. 1st, is made.

IRON—MARQUETTE RANGE.

EAST JACKSON MINING COMPANY.—This company has struck a lense of ore 100 ft. south of its shaft. At the time of last advices the drift had penetrated the ore body a distance of 15 ft.

EAST NEGAUNEE.—This group of mines is being actively wrought. So far this season 150,000 tons have been shipped. A large part of the season's output, it is said, has been sold at profitable figures. Development work is keeping pace with production, six drills being employed. The small deposit west of No. 2 Buffalo shaft has been opened up, and its yield and character have exceeded anticipations. The mine is being opened out both in depth and longitudinally. The openings are now three years ahead of the actual mining operations, which are still in the old workings, and consist in drawing the old pillars. Some time during the autumn some of the machinery will be supplanted by an equipment more suitable for deeper mining.

IRON—MENOMINEE RANGE.

HAMILTON ORE COMPANY.—During the month of June, No. 2 shaft at the Hamilton mine was sunk about 56 ft. It is now 1,213 ft. deep. The drift from No. 1 to No. 2 shaft is in 250 ft. A Marion steam shovel has been purchased.

MONITOR.—This mine has forwarded nearly 15,000 tons of ore, and has the figure set at 75,000 for the season. The 1890 output was 26,336 tons. The daily shipment is about 500 tons.

The Crystal Falls *Diamond Drill* furnishes the following concerning the properties in the Crystal Falls district: "The South Mastodon, Alpha, and Atlas properties near the Mastodon mine are at present idle. It is quite probable the South Mastodon will resume operations before the season is over, and will make all-rail shipments. The Alpha is in good form to commence work at any time. The Atlas, Capt. C. T. Robert's property, is supplied with all that is necessary to start work on short notice when the time comes."

GREAT EASTERN.—At this mine a small force of men is engaged in putting down a shaft, which is now about 30 ft. deep, 27 of which is in the ore; a drift was driven a distance of 15 ft. in ore. The ore is very hard, and some of it, it is said, runs as high as 62% in metallic iron. The trend of the formation seems to be very irregular.

MINNESOTA.

IRON—VERMILION RANGE.

The Ely *Times* states that the survey which was started to extend the Duluth & Iron Range Railroad from Ely to the Canadian border has been discontinued, at least for the present. About 24 miles remain uncovered.

MISSOURI.

JASPER COUNTY.

(From our Special Correspondent.)

JOPLIN, July 13.

The past week was quiet among the mines of this district. There was a heavy output of ore, but rather light sales, owing to a decline in the ore market, many large operators holding their output for better prices. The average price paid for zinc ore was $22 per ton. The price of lead remained at $25.50 per thousand.

Following are the sales from the different districts;

Joplin mines, 1,217,790 lbs. zinc ore and 150,430 lead; value, $17,226.50.

Webb City mines, 743,350 lbs. zinc ore and 47,430 lead; value, $9,287.

Carterville mines, 1,678,030 lbs. zinc ore and 55,380 lead; value, $19,868.50.

Zincite mines, 304,680 lbs. zinc ore and 5,690 lead; value, $3,650.

Galena-Kansas mines, 983,390 lbs. zinc ore and 120,000 lead; value, $13,324.

District, total value, $63,356.

Pittsburg-Kansas spelter output: R. Lanyon & Co, 189,650 lbs.; S. H. Lanyon & Bro., 97,000 lbs.; W. & J. Lanyon, 96,800 lbs.; Granby M. & S. Company, 97,100 lbs.; Weir City Zinc Company, 185,000 lbs.; Pittsburg & St. Louis Zinc Company, 75,650 lbs.; total, 741,200. Coal output, 12,000 tons.

MONTANA.

A new coal mine has been discovered on the line of the Great Falls & Canada Railroad. It is in Kennedy's coulee some distance this side of the Canada line, and is about 25 miles from the railroad. The mine has been developed some and shows a good and very promising vein. The quality of the coal is good. The property belongs to some Great Falls capitalists.

DEER LODGE COUNTY.

CHAMPION MINING COMPANY.—The mill of this company has been shut down owing to the extremely bad condition of the roads. Work is progressing as usual at the mine, and a good supply of very fair ore is obtained.

SOUTHERN CROSS.—Work was resumed at this mine on the 6th inst. Secretary Guy X. Piatt has closed contracts with the Colorado Smelter, of Butte, and a Helena smelter to handle the ore, which will be hauled by teams to Anaconda or Phillipsburg, and thence by rail to Butte or Helena.

JEFFERSON COUNTY.

ALAVIESKA MINING COMPANY.—This company has bonded the Blackbear mine, in the Cataract district, for $20,000. There is some litigation concerning the property, and the purchase price is to be paid when the suits are decided.

MADISON COUNTY.

MCCRANOR.—The tunnel on the Van Meter lode of this group is now in 1,100 ft., and for most of the distance has been in ore of rather low grade, but containing sufficient mineral to pay for concentrating. In the tunnel, about 350 ft. from the surface, the vein of what is supposed to be the Sheridan lode was tapped, exposing a 4-ft. vein of $100 ore.

MEAGHER COUNTY.

KING FLUME COMPANY.—The hydraulic operations of this company at Diamond City are now in full blast. The abundance of water assures a good clean-up, which will be made in November. Several good-sized nuggets have already been picked up by the men in the sluices.

MISSOULA COUNTY.

The commissioners of this county have appropriated the sum of $3.000 to aid in the construction of a wagon road to Mineral Hill. This will be the means of opening what is said to be one of the finest mineral sections of the county.

IRON MOUNTAIN MINING COMPANY.—Ground has been broken for the new dressing works. They will have a capacity of 75 tons per day.

SILVER BOW COUNTY.

ANACONDA MINING COMPANY.—This company has obtained an order from the court restraining the Clark mine, owned by H. L. Frank *et al*, from taking out any ore. A rich body of ore was encountered in the Clark recently, and about 30 tons were broken and hoisted when the injunction proceedings were instituted. Besides stopping the Clark people from working their claim, the Anaconda company wants $1,200 for the ore taken out, claiming to own the property.

BOSTON & MONTANA CONSOLIDATED COPPER AND SILVER MINING COMPANY.—The new shaft which is being sunk between the two Colusas has reached a depth of 600 ft., and after the sump is finished the station will be cut and crosscuts started for the veins. When the new hoisting engine is in place sinking in the new shaft will be resumed until a depth of 1,000 ft. is attained.

NEVADA.

ELKO COUNTY.

SAN FRANCISCO, July 9.

(From our Special Correspondent.)

BELLE ISLE MINING COMPANY.—A break in the vein has been found in the north drift from the west crosscut, 350 level. The ore up to this point is very high grade. The stopes above the 350 level are looking well, and during the last week yielded 19 cars of first-class and 43 cars of second-class ore.

NEVADA QUEEN MINING COMPANY.—The east crosscut has been advanced 10 ft. to the hanging wall, exposing 18 in. of low-grade ore lying next to the wall.

NORTH COMMONWEALTH MINING COMPANY.—Nine cars of ore were extracted during the week ending July 4th from the first level, the average car-sample assay being $359 per ton. The water on the third level has drained down, and this week the vein is being cut into.

NORTH BELLE ISLE MINING COMPANY.—The rock in the east crosscut, 450 level, is said to look favorable for ore. Some quartz encountered in No. 2 crosscut, 400 level, is giving low assays. The face of the east crosscut, 600 level, is getting harder and shows seams of spar.

ESMERALDA COUNTY.

(From our Special Correspondent.)

CONSOLIDATED CANDELARIA MINING COMPANY.—The organization of this company, absorbing the Princess Mining Company, the Candelaria Water Works and Mining Company, the Georgine Mining Company, and the Holmes Mining Company, has attracted considerable attention to the work being done at the Holmes mine. As already advised in the ENGINEERING AND MINING JOURNAL, the Doris syndicate retains a large interest in the consolidated company. The various claims owned by this syndicate are numerous and extensive, embracing the old General Thomas and Northern Belle companies, which have paid a total of nearly $3,000,000 in dividends. Of the group, however, the Holmes mine is the most important. Not the least interesting feature of work at the Holmes mine has been the success attendant on the experiments in leaching. In the early days ore extracted from the Northern Belle, which would not assay above $40 to $50 per ton was thrown on the dumps as waste. Thousands of tons of this ore has accumulated, and as it was found too that in consequence of the heavy discount on silver the lower grades of ores taken from the mine could not be reduced profitably through the ordinary amalgamating process, other means had to be devised. The assays from the leaching of roasted ores from the Holmes mine have ranged from 5 to 36 oz. per ton, the chlorinations ranging from 80% to 91·8%. The Princess mine has not been worked recently, but it is known to contain extensive bodies of medium-grade ores. The Georgine mine, also, has not been exploited thoroughly, but a gang of men have been working under a seam of rich ore, and under the new order of things extensive operations will be inaugurated. The Princess mill, which is generally running on Holmes and other ore from this group of mines, is a 30-stamp dry crushing mill, having a capacity of 90 tons per day.

HUMBOLDT COUNTY.

LANG SYNE.—A rich strike of gold ore is reported to have been made in this mine, near Dun Glen. The small vein of ore which has been worked hitherto is said to have paid well.

LINCOLN COUNTY.

PIOCHE MINING AND REDUCTION COMPANY.—The main working shaft of the Yuba mine is being sunk 100 ft. deeper, which will give it a total of 1,400 ft. Drifts north, south, east and west will be run from the 1,400 level to strike the three ledges shown at the 1,300 level.

STOREY COUNTY—COMSTOCK LODE.

(From our Special Correspondent.)

The following is the weekly statement of ore extracted and milled, with the average battery assays:

Mines.	Tons. Extracted.	Tons. Milled.	Assay Value July 4th.	Assay Value June 27th.
Con. Cal. & Va.....	2,375	2,345	$29.07	$29.12
Chollar.....	535	535	19.76	18.22
Justice.....	....	1d4	17.02	14.05
Ophir.....	32	....	21.50	21.00
Overman.....	....	N't rep'd	....	16.08
Savage.....	....	540	18.56	16.57
Yellow Jacket....	....	N't rep'd	....	18.00

CONSOLIDATED CALIFORNIA & VIRGINIA COMPANY.—Good ore is being mined from the end of the west cross-cut from the north drift upward to 9th floor above the 1,500 level sill floor. Above the 9th floor the slope is narrowing, the ore being also of lower grade. About 200 feet south of the north boundary line, 44 feet above the sill floor, 1,300 level, a considerable quantity of good ore is being taken out. On the 1,650 and 1,750 levels the various openings have yielded the usual quantity of ore of fair quality. During the week bullion valued at $59,236 was shipped to the Carson mint.

The amount of ore crushed in June was 10,250 tons, yielding $125,112.84 in gold and $154,004.90 in silver, a total of $279,117.74, which is $27,000 more than the output in May, and the largest of any month since October, 1889. The output for the nine months from October, 1890, to June, 1891, both inclusive, has been $1,403,418; for the same time in 1889-90 it was $1,894,583. During June the Eureka and Morgan mills were in operation. Battery samples averaged $33.12 and yielded $27.23, or 82%, against $33.75, $27.46, or 81%, in May. The company has declared a dividend of 50c. per share, amounting to $108,000, payable on the 17th inst. This is the first dividend declared since April, 1890.

HALE & NORCROSS MINING COMPANY.—Forty feet of the south drift from new station from north winze, 50 ft. below 1,400 level, is in quartz carrying some pay ore. The north drift from this station is now in 34 ft., the face all being in fair-grade ore. On the 1,500 level the north lateral drift has been advanced 170 ft. from the station. This drift has exposed a strong body of low grade quartz 75 ft. north of No. 1 west crosscut. No. 2 west crosscut has been advanced 10 feet, all in quartz carrying streaks of ore.

OCCIDENTAL MINING COMPANY.—The usual quantity and quality of ore was extracted last week from the various openings in the mine. The company's 20-stamp mill started up this week, and it is expected will average 50 tons of ore per day.

WEST CONSOLIDATED VIRGINIA MINING COMPANY.—A fortnight ago quite a sensation was occasioned by the filing of a suit by Oscar Steel against J. W. Brown, M. W. Fox, and other officers of the above company. In the complaint Steel alleges that he, as the owner of the property, had contracted with Brown & Fox to organize the company, and list it on the San Francisco Stock Board; that they had never done so, but, on the contrary, had defrauded him out of his property, and in consequence he sought to enjoin the defendants from disposing of any more of the company's stock. This is the ostensible basis of the present suit, but there is said to be much more beneath the surface. It is asserted that Steel has sold his interest in the West Consolidated Virginia mine to the Consolidated California & Virginia people, who, having gobbled the Andes mine, are now seeking to do the same thing with the West Consolidated Virginia mine. To understand the ulterior object in view it is necessary to go back some years in the history of the latter named company. When the Consolidated Virginia & California Mining Companies—then distinct companies—applied for their patents their claim embraced the William Penn (now the West Consolidated Virginia) ground. Oscar Steel, the owner at that time, entered a protest, and the two opposing companies agreed, that if he would withdraw his protest they would deed back to him the ground covered by his protest, and the ledge cropping upon the surface line, known as the middle ledge. Last year the Andes people struck an ore body, and drifting upon it made such a showing, as to cause the Bonanza firm to secure control of the Andes mine. The West Consolidated Virginia Company, however, having reason to believe that the reported ore strike in Consolidated California & Virginia ground about two months ago was actually in the west ledge belonging to the West Consolidated Virginia, and which had been encountered by the Andes people, gave notice to the Consolidated California & Virginia Company that it would be enjoined from extracting ore from this ledge. This action has precipitated the suit just commenced; for the Bonanza firm seems determined to secure control of the West Consolidated Virginia ground, which is sandwiched in between the Andes and Consolidated California & Virginia mines. An examination of the last official survey reveals the most extraordinary mode of working by the Andes and Consolidated California & Virginia companies. In the 14 years since the Andes company was incorporated the amount of work done in the Andes ground has been very small; with the exception of a comparatively short time when outsiders acquired control nearly all the work done was in ground belonging to the Consolidated California & Virginia Mining Company, and if any ore had been discovered it must have fallen to the last-named company, whose directors most certainly were cognizant of the course of action being pursued. Yet for doing the large amount of exploration work in Consolidated California & Virginia ground that the Andes company has done its shareholders have been mulcted millions of dollars in assessments. In December, 1888, Messrs. Brown & Fox secured control of the Andes mine, Oscar Steel being appointed superintendent of it and the West Consolidated Virginia. He opened a west drift from the 175 level in the Andes and carried it west, connecting with the West Consolidated Virginia shaft for ventilation. On the 350 level another west drift was opened, and extended beyond West Consolidated Virginia ground 100 ft. into the Andes proper, where the drift ended when the change of administration took place in October, 1890. This was the only work done in Andes ground in 14 years. It will be seen from the foregoing that the present suit, instituted against the West Consolidated Virginia Company, if decided in favor of the complainant, would be to the advantage of the Bonanza firm. A rather curious point, which seems to indicate the fine handiwork of a longer head than Mr. Steel's, is the fact that while the suit is supposed to be based on a contract between Brown, Fox & Steel, the last-named does not seek relief by suing the two former parties to the contract, but has instituted against them and others in their official capacity as representatives of the West Consolidated Virginia Company. On June 29 the matter came up before Judge Wallace on the question as to whether the injunction should be issued. The wind was taken out of the sails of the complainant by defendant's counsel conceding that the injunction should issue. This seemingly was just what was not wanted, and opposing counsel engaged in some lively wrangling as to whether Fox should be put on the stand. Finally Mr. Fox took the stand and declared that he had neither brought the stock into court, nor did he know the numbers of the certificates. Defendant's counsel, objecting to the line of examination being adopted, thereupon advised his client to refuse to answer any such questions; whereupon Fox refused to say anything further. "Do you take the responsibility for not answering, yourself?" asked Judge Wallace. "I do, sir," replied Fox. "Then I commit you for contempt," announced the Court. "You will be confined in the County Jail for three days and until such time as you can answer questions." Plaintiff's counsel then asked for an injunction on the property of the mine, which Attorney Baggett, for the defendants, blandly conceded, but promptly objected when an attempt was made to put witnesses on the stand to find out about the property. After the raising of many points by both sides Judge Wallace recollected, what he seemed to have forgotten, that the Court was sitting merely to take depositions on the question of the injunction, and as that had been conceded there was nothing before the court. That being so, the order committing Fox for contempt was vacated, as he did not happen to be in contempt when refusing to answer questions relative to matters not before the court. Thus the matter stands at the present time. It should be recollected that Brown and Fox are among the prime movers in the actions against the swindling mill ring and have been instrumental in exposing the disgraceful operations of the ring owners. There is in this quite sufficient to account for any amount of animus against them on the part of the Consolidated California & Virginia people.

NEW MEXICO.

GRANT COUNTY.

(From our Special Correspondent.)

According to telegraphic advices an important deposit of meerschaum has been discovered in the northern part of this county. Samples taken from the croppings several months ago and forwarded to Berlin and Vienna have been pronounced by experts in both cities to be genuine meerschaum. When the results of the tests were received C. Rogers and M. W. Neff, of Silver City, at once proceeded to locate a claim. The deposit is on the Sapello Creek about 25 miles from Silver City, and only a short distance from the alum deposits on Gila River. There are several narrow veins on the claim just located, the principal one of which

runs the entire length of the location, 1,500 ft. being 8 in. in width. A specimen was recently exhibited which measured 8 in. in thickness and about 3 ft. wide by 5 ft. long.

LINCOLN COUNTY.

OLD ABE.—This mine is said to be producing about $50,000 per month, and two offers for its purchase have recently been refused by its owners. It is considered one of the most promising gold mines in the territory, being developed as yet to but moderate depth.

SOUTH HOMESTAKE.—Fire caught in the shaft on the 30th ult. and burned to 100 feet from the surface. The ground above the 50-foot level caved. Two men were suffocated.

SANTA FE COUNTY.

Dry washing is said to be successful in the placers in the Golden and Dolores districts, where are some of the richest placer mines in New Mexico. Their development has been retarded hitherto by lack of water. Dry washers have been tried before, but with unsatisfactory results. The small hand machines in use at present are said to give a daily clean-up of $4 to $5 per day.

NEW YORK.

NEW YORK CONCENTRATING COMPANY.—It is said that this company, in which Thos. A. Edison, Senator Jones, of Nevada, and others are interested, is soon to begin operations on a large scale in the abandoned iron mines about Peekskill. The Edison magnetic separator (illustrated and described in the ENGINEERING AND MINING JOURNAL, December 8th, 1888) is to be used to reclaim thousands of tons of low-grade iron ore heretofore considered useless. The first to be worked will be the Sunk Mines, about seven miles from Peekskill, on the northern boundaries of Putnam Valley, which are owned by the Philadelphia & Reading Railroad Company. The latter company has leased the mines to the New York Concentrating Company for 50 years at a royalty of 20 cents per ton. A plant to cost $100,000 will be erected by the lessees. Thomas A. Edison is president of the company, and Chas. A. Batchelor, general manager.

OREGON.

BAKER COUNTY.

OREGON GOLD COMPANY.—It is learned, says the Portland *Oregonian*, that the McArthur-Forrest people, Denver, Colo., expect to make a second test on 100 tons of ore at the Eureka and Excelsior mines of this company. The well-known mining engineer, John B. Farish, of Denver, will superintend the test on behalf of the company. Work on these well-known paying properties has been suspended for some time owing to some hitch in the plant. The new plant, put in at a cost of $100,000, was defective, and the McArthur-Forrest people have undertaken to remedy these defects with improvements of their own. They have already expended about $8,000, and now are about ready to make another test. This money is to be refunded to them by the company if the new process proves a success. If the test at the Eureka and Excelsior mines proves a success the company will adopt the process and erect a plant with a capacity of 100 tons per diem. These mines are in the Cracker Creek district and they are the richest in eastern Oregon. The company is composed of St. Louis capitalists and Jonathan Bourne, of Portland, Ore., who was the original owner of the property.

PENNSYLVANIA.

COAL.

Jacob E. Ridgeway, of Philadelphia, has purchased about 2,000 acres of coal land in Cecil Township, Washington County.

Jonathan Allison, of Washington, Pa., has sold his mines at Allison, and will retire from active business. Cook & Sons, of Canonsburg, were the purchasers.

The coal miners of the Clearfield region have adopted a scale fixing the standard thickness of veins at 3½ ft., for which their wages will be 50 cts. per gross ton. The conference of operators and miners in the Beech Creek and Phillipsburg districts held in Phillipsburg a week ago resulted in the operators refusing to sign any scale, owing to the stagnation of the trade. Application was made to Governor Pattison for permission to incorporate the Phillipsburg, Beech Creek & Osceola Check weighman Association, in accordance with the act of 1889.

KINGSTON COAL COMPANY.—A disastrous cave-in occurred on the 12th inst. at the old slope of this company near Larksville, 5 miles from Wilkesbarre. The cave was caused by the snapping of the old timbers in the slope directly under the fanhouse. The surface sank so suddenly that the upward rush of air lifted the roof off the fanhouse. For hundreds of feet in all directions the surface is covered with large seams and cracks, some of them a foot wide and extending down into the workings. A number of houses in the village of Larksville, which is directly over the mine, were damaged. A dozen men were at work in the mines at the time, but they escaped through a second opening. The company began at once to rebuild, but Mine Inspector G. M. Williams secured an injunction against it on the ground that the new breaker would be within 200 ft. of the mouth of the shaft, which is contrary to the new anthracite mine law. Judge Rice sustained the injunction.

BELL, LEWIS & YATES COAL MINING COMPANY.—This company will open at Rathmel, near Reynoldsville, Pa., a large colliery. The company is driving a tunnel from Sykes to Rathmel, which will be finished in the spring of 1892. By that time it is the intention to have six parallel headings driven into the hill at the Rathmel side. From these six main headings it is proposed to take daily 6,000 tons of coal.

NATURAL GAS.

According to the opinion of a gentleman connected with a prominent company which draws its supply from the Murraysville district and who is familiar with that field, says the Connellsville *Courier*, the rock pressure of the wells is falling off and pumps must be used to force the gas to its destination. More prolific fields are being sought, and it is feared that all large consumers will necessarily be cut off as rapidly as their contracts expire. The pumping machines referred to cost $75,000 each, or $225,000 for a complete set of three, and developments in new fields are being watched with much interest in consideration of the heavy expenditure required.

OIL.

At Stony Run drilling for oil is prosecuted as vigorously as ever, and a depth of 190 ft. has been reached. The prospectors expect that oil will be struck at a depth of 200 ft.

The chief of the Bureau of statistics reported the total value of the exports of mineral oils from the United States for the month of June, 1891, and during the twelve months ending June 30, 1891, as compared with similar exports during the corresponding periods of the preceding year as follows: June, 1891, $4,039,524; June, 1890, 4,122,861; twelve months ending June 30, 1891, $51,313,454; twelve months ending June 30, 1890, $50,854,522.

SOUTH DAKOTA.

LAWRENCE COUNTY.

IRON HILL MINING COMPANY.—According to the Black Hills *Times* the new ore body recently opened by this company assays from 80 to 100 oz. silver per ton and 40% to 60% lead. The ore is galena. From present indications the strike appears to be quite extensive.

MAY FLOWER.—The first clean up of the Bartow and Wilson mill at Central City was made on the 8th inst. and returned $2,800. This is the product of 500 tons of ore from the May Flower mine on Hidden Treasure Gulch, formerly known as the Badger.

RETRIEVER MINING COMPANY.—According to the report of the treasurer for the two years from July 1, 1889, to July 1, 1891, the cash on hand, July 1, 1889, was $466.83; receipts from 1,588 tons of ore, $24,945.39; miscellaneous, $406.25; total, $25,818.37. The expenditures for mining were, $5,989.94; patenting claims, $505; dividends 1 and 2, $12,497.50; cash on hand July 1, 1891, $6,825.93; total, $25,818.37. The company also had about 300 tons of ore in transit to smelters estimated to net $6,000, and 500 tons of ore on the dump the net value of which was about $9,000. The president of the company in his report recommends that the latter ore be held, as it can be treated at Deadwood in a short time so as to save $7 per ton. The company is now taking ore of good grade from the north end tunnel and is also operating from the shaft workings. The cost of mining, including dead work, is $2.80 per ton of ore.

TEXAS.

EDWARDS COUNTY.

A mysterious hole in this county, known as the "Devil's Sink Hole," was recently partially explored, a man being lowered into it by a rope. The bottom was found at a depth of 150 ft., a passage-way 7 ft. high and about 5 ft. wide leading from it. This was followed for 300 ft. when further progress was prevented by a body of water. Samples of the rock found in the excavation are said to have assayed 30 oz. silver per ton, and the opening is supposed to be an abandoned Spanish mine.

UTAH.

BEAVER COUNTY.

CACTUS COPPER COMPANY.—This company expects to begin producing steadily within a short time. The shaft is now down 195 ft., showing a vein of copper sulphide ore 5 ft. wide, which will net about $40 per ton.

JUAB COUNTY.

BUCKHORN GOLD AND SILVER MINING COMPANY.—The production of the Buckhorn mine at Dugway to the end of June, it having been opened less than four months, was $22,000. Mining and development expenses amounted to $4,600. In addition there were 200 tons of ore estimated to contain 12,000 oz. silver, with gold enough to pay expenses of freight and reduction, on the dump. Freight from Dugway to Salt Lake costs $18 per ton.

The company has decided to erect smelting works at the mine, the cost of shipping to Salt Lake at the present time being so high. An order will be placed for a 40-ton furnace, with the necessary machinery, at once, and it is expected that the company will be reducing its ore within three months. It is intended to do some custom work also, which will be of great advantage to other mines of Dugway.

BULLION, BECK & CHAMPION.—The working force was largely increased recently. Some excellent ore is being uncovered on the 700 and 800 levels. The shaft is now being sunk below the 800 level. It will certainly go to 1,000 ft. at once, and possibly deeper.

CENTENNIAL-EUREKA MINING COMPANY.—This company paid dividend No. 14 of $2 per share, or $60,000, on the 15th inst., being twice the amount paid in June. It is said that this will be the regular rate in the future, the amount of ore being produced by the mine warranting it. The company has paid $180,000 so far this year. There was a rumor in Salt Lake City recently that a French syndicate had secured an option on a controlling interest in the company at a price equivalent to $100 per share, but nothing definite is known concerning the matter.

MAMMOTH MINING COMPANY.—The new machinery is in place and the head house nearly completed. A force of 65 men is breaking ore above the tunnel level and a moderate amount is being shipped. It is expected that the new machinery will be ready by the first week in August, when a full force will be put to work.

SOLID MULDOON.—Ore has been struck on the 600 level through the Bullion, Beck & Champion workings. The mine was recently purchased by John Beck for $50,000.

SALT LAKE COUNTY.

INLAND SALT COMPANY.—This company has contracts with Montana metallurgical works for 45,000 tons of salt. The company is also selling a considerable amount of table salt in Colorado.

MINGO SMELTING COMPANY.—This company has been organized to take over the Mingo smelting works. The capital stock is $500,000, divided into 5,000 shares held as follows: James E. Schwartz, of Pittsburg, Pa., 4,970 shares; Robert Wardrop, of Shields, Pa., Basil W. Doyle, of Sewickley, Pa., Herbert E. Anderson, of Pittsburg, Pa., William J. B. Walker, of Sandy, Utah, and Frank H. Officer and William Reid, of Salt Lake City, 5 shares each. The officers for the ensuing term are, James E. Schwartz, president and director; Robert Wardrop, vice president and director; William Reid, secretary and director; Frank H. Officer, treasurer and director; Basil W. Doyle, Herbert E. Anderson and William J. B. Walker, directors.

NIAGARA MINING AND SMELTING COMPANY.—Dr. P. A. H. Franklin, president of this company, has recently consummated one of the largest mining deals on record. The capital stock of the company has been increased from $2,000,000 to $10,000,000, and a large amount of Eastern and English capital has been interested in the enterprise. With its new backing the company has been able to absorb the property of the South Galena Mining Company and the old Jordan and Highland groups of mines at Bingham, all of Prof. Holden's interest at that place having been acquired. The tramway in Bingham cañon, three miles long, connecting the mines with the railway, has also been acquired, together with the famous Old Telegraph mines and its smelting works at West Jordan. With the Niagara group proper the company will control practically all of the property in Bingham cañon, having 154 claims in all. It is said that the company owning the Hanover smelter, and the Lead, Brooklyn and Keystone group of mines in the Bingham district has given the Niagara an option on its property. The officers of the Niagara Mining and Smelting Company are Dr. P. A. H. Franklin, of Salt Lake, president; George M. Dickerman, of Boston, vice-president; C. M. Schermerhorn, of Philadelphia, secretary; and G. Palen, of Philadelphia, treasurer. Col. N. Treweek, of Salt Lake, will continue to act as general manager. The company will immediately commence the development of its extensive property upon a large scale.

PETRO MINING COMPANY.—Dividend No. 3, of 75 cents per share, amounting to $7,500, was paid on the 15th inst., making $17,500 paid this year. The mine is looking very well. An option on the shares of the company was given some time ago at $9 per share.

SUMMIT COUNTY.

CRESCENT MINING COMPANY.—The product of the mine, January 1st–June 13th, 1891, was 3,414,465 lbs. ore, with 100,420 oz. silver and 314 oz. gold. The whole of this ore was mined above the 200 level.

DALY MINING COMPANY.—The product during the first six months of the year was: sulphides, $220,195; ore sales, $120,003. The dividends paid amounted to $225,000. It is reported that the company will erect a plant to refine its sulphides, this work having been done hitherto at the Omaha works of the Omaha & Grant Smelting and Refining Company.

MASSACHUSETTS MINING COMPANY.—The company has suspended operations, the cause assigned being lack of harmony among the directors. There is no probability of anything further being done until after the shareholders' meeting in September next.

ONTARIO MINING COMPANY.—The product of this company for the first six months of the year was: Silver bullion, 465,578 oz.; ore sales, $333,522. Dividends paid amounted to $450,000.

BUILDING MATERIAL MARKET.

NEW YORK, Friday Evening, July 17.

A week has passed, and, contrary to precedent, not a strike has occurred during that time to disturb the equanimity of the building trades. Operations are reported quite brisk and the consumption of material good.

Bricks are going into consumption rapidly, and are arriving equally as fast. Dealers speak of the market as active, and one which promises permanency throughout the season. Prices are: for up rivers, $4.50@$5; Haverstraws, $5@$5.50.

Lime.—That condition of affairs predicted some time ago is being rapidly brought about. At the present writing there is no lime in the market, but little on the way, and exceedingly light stocks in store. At Rockland the manufacturers' sheds are empty. In the face of these facts kilns are closed down, and it looks as if a very determined effort was being made to force up prices. Quotations which are very firm, are 90c.@$1 for finishing.

Cement.—There is no change in market conditions, the demand continuing good, and the supply adequate. Prices remain at 90c.@$1.

Lumber.—The St. John strike continues. Stock continues to come forward and for this reason the local market has not felt the shut-down. There is only a moderate demand, and very few contracts. Laths have been in good request and the price has gone from $2 to $2.25. Quotations are: Spruce, $13.50@$15.50 for random, and $16@$16.50 for special cargoes; white pine for South America, $21@$30, and for West India, $17.50@$18.50; yellow pine, $18.00@$21.50 for random, and $21@$23 for special cargoes; flooring boards, dry, $21@$22; green, $19@$21.

NOTES OF THE WEEK.

A raft 4,000 feet long, containing over 10,000 logs, arrived at the lumber yards of James D. Leary, at Whale Creek, on the 14th inst. It was towed from St. Johns, N. B., in 16 days.

CHEMICALS AND MINERALS.

New York, Friday Evening, July 17.

Heavy Chemicals.—There was about the same volume of trade as in the previous week. The glass factories are still idle, and spot sales are the exception rather than the rule. The "vacation period" has settled down over the heavy chemical market, and trade seems more or less indifferent. There has been little or no change in prices.

Caustic Soda.—Stocks in the different grades are reported light. 60%: A few small sales have been made for July and August shipments at 3·25@3·32½c. 70-74%: The light stocks reported last week have not been increased by arrivals. Prices in the face of a light demand remain at 3·05@3·10c. 77%: Stock is low; arrivals are expected within a short time. Sales of 175 drums are reported at 3·05@3·10c.

Caustic Soda Ash.—This market has stiffened perceptibly on account of light stocks; sales have been made at 1·60@1·70c.

Alkali, 48%.—The inactivity among the glass makers renders the spot market *nil*, while the numerous contracts extending into 1892 which have been chronicled in previous reports contribute to a dull market in futures. B. M. remains at 1·55@1·60c. Of high test B. M. 350 tons sold at 1·42½@1·45c.

Sal Soda.—Stocks are light, and the market has a better tone at 1·05@1·07c.

Bleaching Powder.—The demand has fallen off somewhat. Stocks continue light. Spot is firm at 1·80@1·85c., at which price 75 casks have been sold. Futures are selling as last quoted at 1·75c.

Acids.—From all quarters we receive reports that the trade is very good, and that it makes promise to hold its volume through the summer. The heavier acids are all active, and some dealers report more of a business than they are prepared to meet. This is especially true of sulphuric. Prices remain about as last quoted, namely:

Acid per 100 lbs. in New York and vicinity: Acetic, 1·65@1·75c.; alum, 1 55@1·75c.; muriatic, 18°, 80c.@$1; muriatic, 20°, 90c.@$1.10; muriatic, 22°, $1@$1.20; nitric, 40°, is selling for $4.50, and from that upward according to quality, etc.; nitric, 42°, $5@$6; oxalic, 7¼@7½c.; sulphuric, 60°, 75c.@$1; sulphuric, 66°, 85c.@$1; tartaric, 33@34c.

Brimstone.—The market, which two weeks ago reached the lowest figure of the year, viz., $24 for spot, has taken a rebound, and $25.50 is now quoted for spot, and in futures $24.70 for seconds and $24 for thirds. As heretofore, there is a dearth of stock in the market, and, while the above quotation is the only one given, those in possession of the commodity have no difficulty in obtaining a higher price. The cause for the rise is to be found among Sicilian producers, one hypothesis being that bankers who have been advancing money to small concerns, and who put down the price in order to realize, have had their claims met, and are now making an effort to force the product back to its old figure.

Blue Vitriol.—The market continues in a demoralized condition. Prices are quoted nominally at 3·50c., although buyers have no difficulty in obtaining goods at ¼c., and even ½c. less. The trade, even at these figures, is light. This product presents a number of interesting features. While the stock in hand is large, it is said that a large per cent. of the available supply of scrap iron which has been used in its manufacture has been absorbed. This has a direct bearing upon the future of both the blue vitriol trade and the trade in other copper salts.

Fertilizers.—The general market is simply a duplicate of that of the last few preceding weeks. There prevails the usual volume of summer business at prices previously quoted. An active market is not looked for before the cooler months.

South Carolina phosphate rock maintains an unchanged position. We quote for land rock $7@$8; wet and dry respectively, f. o. b. vessels at mines, and $7.25@$8.25 f. o. b. cars. There is but little high-grade river rock in the market. Low grades taken from marshes are selling at about $7.25.

We are indebted to Mr. Paul C. Trenholm for the following statement of shipments of phosphate rock from Charlestown, N. C., during the months of June:

	1889.		1890.		1891.	
	Crude.	Ground.	Crude.	Ground.	Crude.	Ground.
Domestic	13,916	.....	14,279	188	29,321	.....
Foreign	.....	.....	12,745	.....	2,143	.....
Total	13,916	.....	27,042	188	31,464	.....

Sulphate of Ammonia.—Continues weak in the presence of large stocks at 3·05@3·10c. Bone sulphate is in little demand at 3·02½@3·05c. Dried blood is more or less of a drug on the market at 1·95@2c. These prices could be shaded a trifle. Tankage is in moderate request at $19@$21.

Azoline is selling in a limited way at $1.90@$1.95. Bone meal is quiet at $22.50@$23.50; raw, $24@$28.

Fish Scrap.—Is in good demand at $21.50@22.50. Wet ascidulated fish scrap is active at $11.50.

Double Manure Salts.—Little in spot business. Quite an activity in futures; 3,000 bags arrived on the 10th inst. We quote the syndicate price of 1·10@1·12c. for 48%. For 90% to 95% basis, 90% foreign invoice, weights and lists, 2·07@2·10c. Lots under 50 tons proportionately higher.

Kainit.—Sales of considerable magnitude have taken place for delivery at Northern ports at $8.75 @$9.75. For Southern ports $1 additional is quoted.

Muriate of Potash.—Recent arrivals are to be noted as follows: On the 11th inst. 150 tons, 13th inst. 50 tons, 16th inst. 500 tons. The market is unchanged. We quote the Syndicate's price per 100 pounds, basis of 80%, $1.77½ for spot and to arrive. Lots under 50 tons proportionately higher.

Nitrate of Soda.—The market is weak because of a poor demand. Prices are 1·90c. for spot and 1·75 @1·80c. for futures. There are 76,000 bags in local stock.

NOTES OF THE WEEK.

The fertilizing works at Perdix, Perry County, Pa., owned by M. M. Groves, of Harrisburg, Pa., were totally destroyed by fire on the 13th inst. The loss was about $15,000.

Liverpool. July 8.

(Special Correspondence of Jos. P. Brunner & Co.)

The market for heavy chemicals continues dull, with a limited amount of business. Rumor has it that the Alkali Company propose to stop the caustic soda plant of one of its large works on account of accumulation of stocks. It still refuses, however, to reduce prices.

Soda Ash is dull, and prices are as follows: Caustic Ash, 48%, £5 2s. 6d.; 58%, £6 4s. per ton; Carbonate ash, 48%, £5 7s. 6d.; 58%, £6 10s. per ton, all net cash. Prime brands are held for a premium on these figures.

Soda Crystals are firm at £3 5s.@£3 7s. 6d. per ton, net cash.

Caustic soda is dull. Prices are without change as follows: 60%, £9 10s.@£9 15s. per ton; 70%, £10 15s.@£11 per ton; 74%, £11 15s.@£12 per ton; 76%, £13@£13 5s. per ton, all net cash.

Bleaching powder quiet at £7 per ton; net cash. Chlorate of potash firm at 5¾d. per pound, less 5%.

Bicarb. soda is firm at £6 15s.@£7 per ton, less 2½%, for one-hundredweight kegs, according to brand and quantity, with usual allowances for larger packages.

Sulphate of ammonia is easier. Good gray 24% in double bags is quoted at £10 17s. 6d.@£11 per ton, and 25% in double bags at £11 2s. 6d.@£11 5s. per ton, less 2½% f. o. b. Liverpool.

MINING STOCKS.

[For complete quotations of shares listed in New York, Boston, San Francisco, Baltimore, Denver, Kansas City, Birmingham, Ala., Pittsburg, St. Louis, London, and Paris, see pages 89 and 90.

NEW YORK, Friday Evening, July 17.

The mining stock market continues inactive and indifferent. Like the general stock market it can be said to be too narrow to turn in, and consequently disgusting to both bulls and bears. There is about the same volume of business. The sales are mostly on Eastern account, and consist of small lots which have been placed upon the market rather than brought out. Horn Silver, Alice, one or two of the Dakota stocks, and one or two high price securities are about the only ones for which there has been any inquiry. The few bids made are generally considerably below sellers' asking prices. The only feature of the week was the decline in the San Francisco market and its effect upon the local exchange. The Comstocks all suffered a marked decline, owing to Western quotations. They were nearly all active. The selling was by Western holders, and purchases were mostly by Eastern investors. The closing was weak, and seemed to indicate that the bottom of the decline has not been reached. The market in detail was as follows:

Consolidated California & Virginia from the closing last week of $7.25 sold at the same figure on Monday. Subsequent sales brought the price down to $5.88, at which figure transactions took place to-day. It sold this morning on the San Francisco exchange $4.75, ex-dividend of 50c. On the last call to-day it was bid $5.50 and held at $6. Transactions during the week aggregated 610 shares. Crown Point opened at $1.25 and during the week came down to $1, at which figure it closed very weak. Gould & Curry likewise suffered a decline, selling from $1.45 down to $1.25.

Ophir from the closing last week of $3.25, opened at $3.10 and declined steadily until the figure of $2.95 was reached. Sales were moderately active. Savage declined 45c. on the week's sales, closing at 50c. Sierra Nevada from a closing last week of $2.30 closed to-day at $2.15. Yellow Jacket sold Saturday at $1.85, and closed to-day at $1.60. It was very weak and on the last call was bid at $1.25. Best and Belcher lead a comparatively active week, falling from $2.40 to $1.80; its sales aggregated 600 shares.

Alta had an active week, opening at 85c., and selling down till 70c. was reached to-day. Chollar closed last week at $2.15, from which figure it sold during the week under review at $2, $1.75 and $1.60, the latter being the closing figure. Comstock Tunnel lead a very active career at generally reduced values; 15c. 16c. and 17c. ruled; 4,500 shares were traded in. There were no transactions in bond or scrip. On the last call to-day for the stock, 17c. was bid and 16c. asked; 40% was bid for the bonds, and 30% asked for the scrip.

Mexican opened at $2.25 and sold down until the figure of $1.80 was reached to-day. On the last call it was bid $1.60. Nevada Queen made a small sale of 30c. at the beginning of the week. Potosi from the last week's closing of $4.60 opened at $4.40 and sold steadily until $3.75 was reached yesterday.

Union Consolidated on quite a number of sales lost 20c. during the week, selling at $1.90. Utah led a very active week, selling at 75c. up to to-day when 65c. was reached.

Colorado stocks were unusually inactive. Leadville Consolidated sold 1,000 shares on Monday at 10c.; the closing price last week was 11c. On the last call to-day 9c. was bid, with no offers. Little Chief sold on the same day to the extent of 300 shares at 30c. Of the stocks not traded in, on the last call to-day we note $2 bid for Aspen, 5c. asked for Bassick, 25c. bid and 32c. asked for Breece, 20c. bid for Chrysolite, 61c, asked for Dunkin, 75c. bid and $1.10 asked for Iron Silver, 8c. asked for Lacrosse, 27c. bid and 35c. asked for Little Chief, 12c. bid for Phœnix Lead, 35c. bid and 60c. asked for Robinson Consolidated, 75c. asked for Small Hopes, and 18c. bid and 35c. asked for Ward Consolidated.

There were no new features in the California securities. Astoria, as usual, was the active stock of the week, selling at one price of 1c. to the extent of 8,200 shares. Belmont was active, selling during the first part of the week at 75c. Sales today were made at 76c. It closed strongly at 76c. bid and 77c. asked. Brunswick made a slight gain in price, selling to the extent of 2,300 shares at 9c. Emmett showed more or less activity during the first part of the week, after which it dropped out of the market. It sold as high as 70c. On the last call to-day 65c. was bid and 73c. asked.

Among the stocks not quoted we note $2.50 bid for Martin White; $1.75 bid and $2.75 asked for Plymouth; 35c. asked for Silver King; 95c. asked for Standard.

There was quite healthy inquiry in South Dakota stocks, and more transactions in these securities during the week than in any preceding week in several months. Alice, which may be said to have been in the best demand, sold 500 shares at $1.60, $1.70 and $1.75. It closed strong at $1.60 bid and $1.75 asked.

Deadwood Terra sold at $1.20 and $1.35. Its closing was not particularly strong, and was at $1 bid and $1.30 asked. A sale of 11 shares of Father de Smet at 30c. took place on Thursday. On the last call 25c. was bid and 36c. asked. Five shares of Homestake, which sold last on January 30th at $9, changed hands at $11. The inquiry in this stock is active, and $11 was freely offered.

Of the Utah stocks there was a good inquiry for Horn Silver. Transactions in this stock took place at $3.50 and $3.40 yesterday, against last week's closing of $3.20. Its sales aggregated 660 shares. Ontario was more active than it has been for several months; $40 was the selling price early in the week, and later sales were made at $39.50; 200 shares changed hands. On the last call $38 was bid and $40.50 asked.

The following sales of mining securities was

made at the Real Estate Exchange during the week: $1,000 of Lehigh and Wilkesbarre Coal Company's 6% bonds, at 100¼; 1,050 shares of Plymouth gold at $2; 1,000 shares of El Cristo at 33c.; 300 shares of Deadwood Terra at $1.33; 100 shares of Homestake, $11; 25 shares Ontario, $38.75; The sales for the week aggregated 30,206 shares. Of this number 6,206 were dividend-paying shares. The sales for the corresponding week of last year were 65,400 shares.

Boston. July 16.

(From our Special Correspondent.)

The market for copper stocks continues dull and featureless, with very little change to note in prices, and there seems to be no prospect of any greater activity at present. What little business there is is done principally by room traders, the public doing very little. Now and then there is a general investment order, but it is exceptional and is quite a windfall for the broker who gets it. The aggregate sales for the week would hardly make a fair day's work in active times.

The report that the Allouez mill was obliged to suspend work for want of water had a depressing influence on the stock and it declined to $2¼. Atlantic sold up to $16¾, but lost the fraction later and closed at $16.

Boston & Montana has been unusually quiet, less than 400 shares having been dealt in during the week. The price, however, has been fairly well maintained at about $45½. Butte & Boston is getting to be more actively dealt in and sold up to $16, but weakened again to $15½.

Nine shares of Calumet & Hecla were sold at $255, which is a decline of $5 per share from last week. Tamarack was more freely offered, and after selling at $155 declined to $150, a net loss of $2 for the week. Centennial was dealt in to the extent of 100 shares at $15¾, a gain of $1 per share from last week's price.

Sales of Franklin at $16½, Kearsage at $12, and Osceola at $38@$37¼, aggregated less than 100 shares, and there were no sales of Quincy.

Santa Fe declined from 50c. to 45c., and Huron sold at $1½. Cœur d'Alene sold at $1¼, the same price as last week.

3 P M.—This afternoon Calumet & Hecla advanced to $259 for one share. Centennial declined to $1, and a small lot of Quincy sold at $110. Napa Quicksilver sold at $4. The other stocks were unchanged.

Denver.

Prices and sales for the week ending July 11th, 1891:

Company Mines.	Opening.	H.	L.	Closing.	Sales.
Alleghany	20a	†15	†15	....	100
Amity	†02¾	02¾	02¼	02½	1,200
Bal. Smuggler	57a	....	....	54	.....
Bangkok-C.-B.	06¼b	06¾	06½	06½	2,800
Bates-Hunter	70a	69	69	68	400
Brownlow	07a	06	05¼	05¼	1,900
Calliope	....	15	15	15	100
Cash	20a	....	....	15	.....
Clay County	125a	118	116	115	*00
Gettysburg	20a	15	15	15	100
Gold Rock	54b	*61	56	57	6,800
Leavenworth	15a	....	....	10	.....
Little Rule	110a	....	....	....	.....
Matchless	....	....	....	290	.....
May-Mazeppa	130a	124	124	122	700
Oro	....	....	....	120	.....
Pay Rock	02¼b	02½	02½	02	1,500
Puzzler	04	*04¼	03½	....	2,200
Reed National	59b	....	....	60	.....
Rialto	108a	107	106	107	900
Running Lode	23b	23½	23	23	200
Whale	26b	26	26	27½	300
Prospects.					
Argonaut	10b	....	....	10	.....
Big Indian	†10b	....	....	†11	.....
Big Six	09b	09	09	08	100
Century	40	40	40	40	500
Claudia J.	‡09½	10	‡08	08½	17,100
Diamond B.	03½b	†04¼	03½	03½	16,400
Emmons	45b	*47½	45	45	7,100
Golden Treas.	†40	†40	33	33½	10,300
Ironclad	02¼	02¼	02	02¼	900
John Jay	06a	05	04¾	04½	10.500
Justice	†15b	†15	12½	12½	2,900
Legal Tender	02b	02½	02¼	02¼	6,700
Morning Glim	47a	....	....	....	.....
Nat. G. & Oil Co.	06½b	*10	06¾	09¼	25,500
Park Consolidated	13b	....	....	11	.....
Potosi	05¼b	06	05½	*06	3,100
Total					121,000

*Buyer 30. † Buyer 60. ‡ Seller 60. § Seller 30. a Asked. b Bid.

San Francisco. July 9.

(From our Special Correspondent.)

The mining stock market reopened on Tuesday, after the few days' vacation, with limited trading and prices generally weak. The heavy tone that at present pervades the market, while in large measure due to the absence of heavy operators, is also accounted for by the uncertain state of affairs owing to the recent decision of the Supreme Court in the case of Cashman vs. Root. Particulars of the ruling were given in the ENGINEERING AND MINING JOURNAL of June 13. An attempt was made to have the case reopened, an application being made that the case be heard by the justices in bank. The application was refused, however, and the consequence is that brokers are diffident about opening accounts with any save old customers, for the reason that should a client be closed out on a margin he has a certain means of recovering his deposit by an appeal to the courts. Whether some means may be devised to evade the law and at the same time hold margin-holding customers to their bond yet remains to be seen.

Meantime trade languishes, and this morning only 22 stocks were called, the total sales amounting to 4,745 shares. Consolidated California and Virginia has been ruling at $6.50 and sold to-day to $6.62½, with light sales. Mexican at $2.15, Ophir at $3, Sierra Nevada at $2.15, and Union at $2.05, have sold steadily, with but little fluctuation.

Of the middle Comstocks Best & Belcher has sold at $2.25, Hale & Norcross freely at $1.95, Chollar at $2.20, and Savage at $1.65.

The Gold Hill stocks have remained inactive, the demand being very limited. Bullion has been sold most freely and has ranged from $2 65 to $2.85. Occidental at $1.10 and Overman at $2.10 have not found many buyers.

Since the reopening of the Board the various groups of outside stocks have been quite ignored, the dealings in regular session being merely nominal.

By Telegraph.—Following are given quotations on the San Francisco exchange, on the opening call, the 17th inst: Alta, 60c.*; Best & Belcher, $1.80; Belle Isle, 50c.; Bodie, 60c.; Bulwer, 35c.; Consolidated California & Virginia ex-dividend, $4.75; Chollar, $1.40; Crown Point, 90c.;* Commonwealth, 45c.*; Eureka Consolidated, $3.25; Gould & Curry, $1.15; Hale & Norcross, $1.55; Mexican, $1.65; Mono, 50c.; North Belle Isle, 35c.; Nevada Queen, 15c.*; Ophir, $2.70; Potosi, $2.95; Savage, $1.15; Sierra Nevada, $2; Union Consolidated, $1.65; Yellow Jacket, $1.40; Utah, 55c*.

Lake Superior Iron, Gold and Silver Stock.

(Special Report by A. M. Helmer, Milwaukee, Wis.)

Iron.	
GOGEBIC RANGE:	
Anvil	$3.50
Ashland	51.00
Aurora	9.25
Bessemer Consolidated Bonds	20%
Brotherton	2.50
Cary	....
Colby	....
Father Hennepin	....
Germania	9.00
Gogebic Iron Syndicate	.25
Iron Belt	1 .50
Metropolitan Land and Iron Co.	60.00
Montreal	10.50
North Pabst	2.25
Northern Chief	30.00
Odanah	13.50
Pabst	....
Palm	1.75
Pence	1.50
Penokee and Gogebic Developm. Co.	....
Ruby	....
Ryan	.35
Section 33	13.50
Windsor	....
Wisconsin Iron and Steel Co.	.60
MARQUETTE RANGE:	
American	$2.25
Champion	78.00
Cleveland	16.50
Cleveland Cliff Iron Co.	....
East New York	2.00
Humboldt	....
Iron Cliffs	....
Jackson	104.00
Lake Superior	56.00
MARQUETTE RANGE:	
Michigamme	....
Milwaukee Iron Co.	$5.00
Negaunee	....
Pittsburg and Lake Angeline	142.00
Republic	30.00
Riverside	....
MENOMINEE RANGE:	
Aragon	....
Chapin	....
Commonwealth	10.50
Florence	....
Hamilton Ore Co.	....
Lincoln	2.00
Mansfield	....
Mastodon	....
Metropolitan	60.00
Monitor	....
Norway	....
Paint River	....
Pewabic	....
Quinnesec	....
Sheldon and Shafer	....
Sheridan	5.00
Vulcan	..
Youngstown	....
VERMILION RANGE:	
Chandler	37.00
Chicago and Minnesota Ore Co	100.00
Clingstone	.25
Inter-Ocean	.25
Minnesota Ore Co.	70.00
Pioneer	...
Vermilion	...
Vermilion P. H. & L. Co	.25
Gold and Silver.	
Badger Silver Mining Co.	3.00
Michigan Gold Co.	.30
Peninsula Gold Mining Co	....
Ropes Gold and Silver Co.	1.75

St. Louis. July 15.

(From our Special Correspondent.)

Mining matters in St. Louis are very quiet and business during the past week was very small. The small amount of business transacted was in a few leading stocks and prices were on the whole slightly lower than a week ago. Granite Mountain was dealt in more than it has been for some time and many small lots were unloaded in the market. The stock rose considerably over its opening price. It opened at $20, and closes at $20.75. Sales amounted to 410 shares, selling at $20@$21.50. The weekly shipments amounted to 44 bars, containing 56,500 ounces of silver and 88 ounces of gold.

Vuma fell off a few cents. It opened at 72½c., and later sold at 76¼c., 100 shares bringing that figure. On Friday 1,100 shares sold at 72½@73¾c., and on Monday 100 shares went at 72½c. Tuesday's sales amounted to 100 shares at 71¼c. To-day the stock is quiet at 70c.

The annual report of the Small Hopes company seemed to help prices very little, the stock falling from 77c. to 72½c., and at one time sold at 70c. There were no sales.

American & Nettie had a couple of good sales this week, but at lower prices than the opening. The stock opened on call at 28⅜c., and during the week 1,100 shares sold at 26¼@27½c. To-day the stock is quiet at 27½c.

Central Silver had a sale this week of 500 shares at 1½c.

* Quotations Thursday, the 16th inst.

Little Albert was weak, and, from an opening quotation of 2½c., 1,000 shares sold at 2c.

Silver Age improved this week and several small lots were sold. On call the stock opened at $1.10 and later 100 shares sold at $1.10. On Tuesday 100 shares brought $1.15. To-day $1.12½ is bid for the stock.

Elizabeth was very quiet and in small demand. No sales were made and the stock closed at $1.75—2½c. below the opening figure.

Breen had no sales and from the opening bid of 45c. closed at 40c.

Montrose was quiet at 60@55c. and closed at 55c.

Salt Lake City.

Prices and sales for the week ending July 11, 1891.

Name and Location of Company.	Opening.	Highest.	Lowest.	Closing.	Sales.
Alice, Mont	1.50	1.55	1.40	1.50	....
Alliance, Utah	....	....	....	....	....
Anchor, Utah	5.25	5.30	5.00	5.30	....
Apex, Utah	.16	.16	.14½	.15	26,000
Barnes Sulphur, Utah	.01	.01	.01	.01	3,000
Big Hole Placer, Mont.	.20	.22	.19	.19	1,500
Centen'l Eureka, Utah	52.00	53.00	50.00	53.00	....
Congo, Utah	.19	.20	.15	.18	15,850
Crescent, Utah	.50	.60	.50	.60	.....
Daly, Utah	19.00	20.25	19.00	20.50	....
Glencoe, Utah	5.50	6.00	5.00	6.00	200
Horn Silver, Utah	3.20	5.00	3.10	5.00	500
Malad Con., Idaho	.02½	.04	.02½	.03½	51,100
Mammoth, Utah	2.50	3.10	2.25	2.80	400
North Eureka, Utah	.10½	.11	.10½	.11	7,000
Northern Spy, Utah	....	....	....	....	....
Ontario, Utah	38.00	39.00	38.00	38.00	....
Stanley, Utah	.05½	.07	.05	.05½	2,100
Utah L & C. Co., Utah	...	....	....	....	....
Utah Oil Co., Utah	....	....	....	....	....
Woodside, Utah	....	....	....	....	....
Total sales					107,650

MEETINGS.

Calhoun Mining and Milling Company, at the office of the company, Room 2, No. 1,645 Curtis street, Denver, Colo., July 21st, at 10 A. M.

Mountain Tunnel Gravel Mining Company, at the office of the company, No. 219 Sansome street, San Francisco, Cal, July 23d, at 1 P. M.

Yellow Jacket Silver Mining Company, at the office of the company, at Gold Hill, Nev., July 20th, at 3:30 P. M.

DIVIDENDS.

Cœur-d'Alene Silver Lead Mining Company, dividend 14, of '02 per share, $10,000, payable August 1st, at the banking house of Hoge, Brownlee & Co., Butte, Mont., transfer books close July 22d and reopen August 3d.

Daly Mining Company, dividend No. 53 of 25 cents per share, $37,500 payable July 31st at the office of Messrs. Lounsbery & Co., Mills Building, No. 15 Broad street, New York. Transfer books close July 25th and reopen August 1st.

Homestake Mining Company, dividend No. 156 of 10 cents per share, $12 500, payable July 25th, at the office of Messrs. Lounsbery & Co., Mills Building, No. 15 Broad Street, New York City. Transfer books close July 20th, and reopen July 26th.

Mollie Gibson Consolidated Mining and Milling Company, dividend No. 8, of five cents per share, $50,000, payable July 25th, at the office of the company in Colorado Springs, Colo. Transfer books close July 27th, and reopen July 26th.

North Banner Consolidated Tunnel Company, dividend of five cents per share, $5,000, payable July 20th, at the office of the company, in Grass Valley, Cal.

Ontario Silver Mining Company, dividend No. 182 of 50 cents per share, $75,000, payable July 31st, at the office of Messrs. Lounsbery & Co., Mills Building, No. 15 Broad street, New York. Transfer books close July 25th and reopen August 1st.

ASSESSMENTS.

COMPANY.	No.	When levied.	D'l'nq't in office.	Day of sale.	Amt. per share.
Alliance, Utah	14	June 19	July 21	Aug. 10	.10
Best & Belcher, Nev	49	June 23	July 28	Aug. 18	.50
Clara, S. Dak	4	June 2	July 20	Aug. 15	.25
Crown Point, Nev.	55	July 9	Aug. 13	Sept. 3	.50
Goodman, Nevada	10	June 2	July 4	Aug. 6	.05
Himalaya, Utah	9	May 27	June 27	July 27	.00½
Inyo Marble, Nev.	13	May 26	July 10	July 28	.10
Northwestern G. & S., B. C.	3	June 18	July 31	Aug. 24	.08
Peer, Ariz	10	May 29	July 3	July 23	.10
Piedmont, Nev.	2	May 21	June 30	July 22	.05
Seg. B. & Midas, Nev	8	June 16	July 20	Aug. 10	.25
Silver King, Ariz.	6	May 20	June 29	July 28	.20
Teresa, Mex	4	June 8	July 11	July 29	.10
Wood River, Idaho	2	June 12	July 13	Aug. 10	.00½

PIPE LINE CERTIFICATES.

(Specially reported by Messrs. WATSON & GIBSON.)

The petroleum trade has been excessively dull during the past week. A late letter from Germany says: "The discussions as to the petroleum monopoly are still carried on, though Messrs. Rothschild, in Paris, declare that they do not contemplate any such project. The Standard Oil Com-

pany is considered the principal promoter of the scheme. Germany imports about 4,000,000 barrels of refined oil annually, subject to customs duty. In order to thwart the monopoly project, it is proposed to maintain this tax for refined oil, and to admit raw oil duty free. In the way a large number of sailing vessels would find employment in the importation of raw oil from the producers in the United States, and in Germany a paying refining trade would spring up."

CONSOLIDATED STOCK AND PETROLEUM EXCHANGE.

	Opening.	Highest.	Lowest.	Closing.	Sales.
July 11.....	68	68	68	68	5,000
13.....	68	68	68	68	7,000
14.....	68	68⅛	68	68¼	7,000
15.....	68¼	68¼	68⅛	68⅛	4,000
16.....	68	68	67⅞	67⅞	6,000
17.....	67½	67½	67½	67¼	4,000
Total sales in barrels.....					33,000

NEW YORK STOCK EXCHANGE.

	Opening.	Highest.	Lowest.	Closing.	Sales.
July 11.....	....	....	....	....	.....
13.....	....	....	....	....	.....
14.....	....	....	....	....	.....
15.....	....	....	....	....	.....
16.....	67	67	67	67	4,000
17.....	....	....	....	....	.....
Total sales in barrels.....					4,000

COAL TRADE REVIEW.

NEW YORK, Friday Evening, July 17.

STATEMENT of shipments of anthracite coal (approximated) for the week ending July 11th, 1891, compared with corresponding period last year.

Regions.	July 11, 1891.	July 12, 1890.	Difference.	
Wyoming Region, Tons	449,542	411,201	Inc.	38,341
Lehigh Region "	123,978	124,820	Dec.	842
Schuylkill Region "	262,972	222,892	Inc.	40,080
Total.....Tons	836,492	758,913	Inc.	77,579
Total for year to date Tons	19,208,458	16,574,949	Inc.	2,633,509

STATEMENT of anthracite coal production for month of June.

Regions.	June, 1891.	June, 1890.	Difference.	
Wyoming Region, Tons	2,104,063	1,808,708	Inc.	295,354
Lehigh Region.... "	584,100	571,199	Inc.	12,900
Schuylkill Region "	1,092,079	1,065,654	Inc.	26,424
Total..... "	3,780,242	3,445,562	Inc.	334,679

Regions.	For year 1891.	For year 1890.	Differen	
Wyoming Region, Tons	9,584,252	7,855,732	Inc.	1,728,520
Lehigh Region.... "	2,903,721	2,930,615	Dec.	26,893
Schuylkill Region "	5,477,119	4,579,605	Inc.	897,513
Total..... "	17,965,093	15,365,952	Inc.	2,599,140

The stock of coal at tide-water shipping points, June 30, 1891, was 678,144 tons; on May 31, 1891, 692,874 tons, a decrease of 14,730 tons

PRODUCTION OF BITUMINOUS COAL for week ending July 11th, and year from January 1st:

EASTERN AND NORTHERN SHIPMENTS.

	1891. Week.	1891. Year.	1890. Year.
Phila. & Erie R.R.....	2,441	54,795	69,969
Cumberland, Md.....	65,382	2,190,836	1,918,833
Barclay, Pa.....	3,976	96,533	77,342
Broad Top, Pa.....	6,584	259,459	271,834
Clearfield, Pa.....	63,345	2,144,888	2,048,042
Allegheny, Pa.....	16,038	682,120	703,822
Beach Creek, Pa.....	44,281	1,225,178	986,965
Pocahontas Flat Top.....	47,278	1,298,807	1,003,444
Kanawha, W. Va.....	36,321	1,229,093	1,086,070
Total.....	285,646	9,181,709	8,166,312

WESTERN SHIPMENTS.

Pittsburg, Pa.....	15,223	545,496	465,653
Westmoreland, Pa.....	22,858	939,814	731,616
Monongahela, Pa.....	10,349	306,285	229,992
Total	48,430	1,791,595	1,427,261
Grand total.....	334,076	10,973,304	9,593,573

PRODUCTION OF COKE on line on Pennsylvania R. R., for the week ending July 11th, 1891, and year from January 1st, in tons of 2,000 lbs.: Week, 103,866 tons; year, 1,832,258 tons; to corresponding date in 1890, 2,857,694 tons.

Anthracite.

The output for the month of June, as will be seen from the accompanying tables, was 3,780,242.03 tons, against an allotment of 3,250,000 tons. The increase over June, 1890, was 334,679.15 tons. The output for the year July 1st was 17,965,093.11 tons, an increase over the corresponding period in 1890 of 2,599,140.13 tons. Notwithstanding this increase the stock at tidewater during the month of June decreased 14,730 tons, it being 678,144 tons June 30th, against 692,874 tons May 31st. This fact in itself makes an excellent showing, and proves that the stock on hand in the East is less of a menace to the trade than it has been at any time during the year. The fact that shipments to the West up to the present time have been much in excess of those of the corresponding period of last year should be kept in mind, however, when these figures are taken as an indication of the status of the coal trade of the country.

The production for the week ending July 11th was 836,492 tons. Counting on 27 working days at this rate the month's production would be 3,764,205 tons. It is certain that the companies up to date have not kept proportionally within their allowed tonnage of 3,000,000 tons. There is no doubt that they are all restricting in a way, but certainly not as strictly as was intended. There remains of the month three weeks in which to conform to the sales agents' agreement. The feeling in the trade is that production will come very close to the limit.

There have been diverse stories in circulation concerning the cut of the D., L. & W. Coal Company. The facts in the case are these: Mr. E. R. Holden, the company's sales agent, upon the adoption of the June circular, cut off orders for delivery under May contracts. He likewise ordered the canceling of June orders upon the July circular taking effect. Parties whose orders were canceled proved to him on the 14th or 15th of June that certain operators were delivering coal at May prices. In consideration of this fact he reversed the canceled May orders, and did it openly, an action which he does not deserve to be censured for.

The trade is inactive to a marked degree. A canvass of the companies shows that a very little coal is moving on old contracts made at June prices. The quantity of coal sold at July rates circular is very limited. Buyers not in immediate want, are holding off, and those few who are in the market are invaryably looking for concessions. The matter of prices, while in not a very firm condition, can be said to be within control. The subject of restricted tonnage must be given strict attention, if the 3,000,000 tons allotment is adhered to.

Bituminous.

The situation while healthy is very quiet. There is still plenty of coal coming forward. The tidewater points both here and in the east are well stocked, and the consumers demands, for the present at least, seems to have been about satisfied. This abundance of stock does not seem to have weakened prices, and they remain firm. Western reports are to the effect that grain is coming into Chicago in a way that promises an active business for the railroads reaching the seaboard. This is going to affect the coal trade in two ways. It will insure a heavy consumption, and at the same time create a dearth in coal rolling stock, especially freight engines. Ocean freights continue very low; 70@75c. is quoted from Philadelphia to Boston, and about the same from Baltimore. Large vessels are somewhat scarce.

It is reported that the Baltimore & Ohio has made a slight allowance to Baltimore shippers in the matter of freight rates. The product of the Cumberland district for the six months ending July 5th was 1,743,800 tons, against 1,519,000 for the corresponding period in 1890. For the West Virginia region during the same period the figures are respectively 447,000 and 332,600 tons.

NOTES OF THE WEEK.

The total production of coke in the Upper Monongahela region for the week ending the 27th ult., was 4,365 tons.

Buffalo. July 16.

(From our Special Correspondent.)

Midsummer quietude prevails in the anthracite coal trade for local and nearby points. Western orders continue to come in quite freely for stocking up the yards in anticipation of fall and winter business. Prices are unchanged as far as the outside public knows. There are no special features to report.

Bituminous coal is quiet, and the published quotations are entirely nominal, as dealers will not allow an opportunity for selling to escape them in the present condition of the market, and make "prices to suit." Stocks are ample for all requirements, and there is a good surplus besides.

The report in circulation that the New York Central & Hudson River Railroad Company was intending to purchase the controlling interest in the Delaware & Hudson Canal Company has been contradicted emphatically by Vice-President Webb of the former company.

The action of the collector of customs of the port of Buffalo in levying 10% *ad valorem* duty upon the natural gas generated and exported by the Provincial Natural Gas Fuel Company of Canada to the Natural Gas Company in Buffalo has been confirmed.

The New York Central & Hudson River Railroad's soft coal contract is understood to have been let last Tuesday. The Fall Brook and Beech Creek regions will supply 800,000 tons, the Fairmount Coal and Coke Company 175,000 tons, and the Pittsburg region collieries the balance. No figures were made public.

The Buffalo *Express* published the following item yesterday: "There is a decided feeling among many of the soft-coal shippers here against what they claim is a flagrant violation of the spirit and text of the Interstate Commerce Law. It is claimed by one heavy dealer that shippers owning or standing in with the roads leading from the coal regions to Buffalo are able to place coal in this market from 10 to 25 cts. per ton less than he can. The method used is said to be the billing coal through to Suspension or the International Bridges and stopping at Buffalo, the shipper thus getting the benefit of the arbitrary from Buffalo to either of these points. The advantage thus gained is an important one in this market, where a shade of a few cents a ton will make a great difference in a contract."

Lake freights on coal firm at unchanged quotations. Delay in arrivals of cars from the mines prevents quick loading of vessels. The rates hence were as follows: 60c. to Chicago, Green Bay, Racine and Milwaukee; 50c. to Portage; 45c. to Gladstone; 40c. to Duluth, Marquette, Kelly Island, Washburn, Ashland and Saginaw; 35c. to Marine City; 30c. to Sandusky and Toledo; 25c. to Bay City, and 50c. to Lake Linden.

The quantity of coal shipped hence by lake from July 9th to 14th, both days inclusive, was 59,720 net tons, distributed about as follows: 24,570 to Chicago, 14,080 to Milwaukee, 9,420 to Duluth, 1,400 to Marquette, 1,980 to Saginaw, 200 to Sandusky, 2,200 to Washburne, 670 to Toledo, 700 to Bay City, 300 to Kelly Island, 750 to Portage, 300 to Green Bay, 1,250 to Lake Linden, 650 to Houghton, and 250 to Put In Bay.

Shipments of coal east by canal for second week in July, 872 net tons; receipts none.

The receipts of coal at Milwaukee this season to July 1st were 351,264 net tons, viz., 239,128 tons anthracite and 112,136 tons bituminous.

Boston. July 16.

(From our Special Correspondent.)

The demand for anthracite coal does not show any marked improvement over that of last week. Agents continue busy on old orders, which they are fast clearing up. Agents are moving shipments forward at a good rate and this prevents any accumulation in the absence of a demand. Prices do not grow any stronger. Some individual operators are known to be shading rather heavily, but most of the leading companies are holding out for pretty near full values.

The bituminous market has worked into a little better shape during the past week. An unexpected call appeared in several quarters, which is regarded as an improvement. Offerings continue large and stocks are big at all shipping points. Prices are ruling fairly steady, $3.40 being quoted on cars here.

Freights are steady. Vessels are offering freely, for which there is but little demand. From New York 60@65c. is quoted; from Philadelphia, 75@80c., and from Baltimore, 80@90c.

The demand at retail is picking up slowly and is considerably better than it was a week ago. Dealers have plenty of coal on hand and will not have to buy for some time. Prices are steady and unchanged.

The receipts of coal at this port for the week ending July 11th were 56,846 tons of anthracite and 19,769 tons of bituminous, against 35,813 tons of anthracite and 18,196 tons of bituminous for the corresponding week last year. The total receipts thus far this year have been 930,172 tons of anthracite and 673,760 tons of bituminous, against 814,862 tons of anthracite and 516,677 tons of bituminous for the same time last year.

Chicago. July 15.

(From our Special Correspondent.)

The anthracite market is dull and heavy, with no immediate prospect of improvement. Trade is light and circular rates are badly cut by both wholesalers and retailers anywhere from 50 to 75c., and even lower rates are more than hinted at. These low prices are not confined to the shippers handling any particular company's coal, but are very general in the trade. The tonnage coming forward is heavy and is not generally going into consumption or into dealers' hands. Stocks are accumulating. Country trade is dull, and the market may be fitly termed a "waiting" one. A prominent wholesaler remarked to your correspondent to-day, "that if the companies would only hold rigidly to an output which would be slightly less than actual demand, the hard coal trade would soon be in a position to take care of itself; but to continue as they are doing is simply encouraging demoralization of prices."

Bituminous coal is still dull, but inquiries for late summer and fall contract coal are about two weeks earlier than usual, and it now looks as though some activity might spring up before the end of the month. Prices are fairly steady, but by no means strong. Pittsburg, Hocking and other coals of similar grade are in fair demand and price steady.

Coke in this market is in oversupply, though agents of the Connellsville article claim they are getting full price for every carload they sell. There is, however, a factor looming up which will soon cut a very important figure in the matter of supply—the expected scarcity of cars as soon as the crops commence to move. Even in railroad circles it is believed that the famine will be greater than felt for a number of years past, and coke and hard coal will feel the pinch earlier than any other product.

Prices of anthracite per ton of 2,000 pounds f. o. b. Chicago are: Lehigh lump, $6.75; large egg, $5; small egg, range and chestnut, $5.40. Retail

prices per ton are: Large egg, $6; small egg, range and chestnut, $6.

Prices of bituminous per ton of 2,000 pounds f. o. b. Chicago are: Pittsburg, $3.25; Hocking Valley, $3; Youghiogheny, $3.40; Indiana block, $2.35@$2 50; Illinois block, $2.15@$2.25.

Coke.—Connellsville, 72-hour, per ton f. o. b. Chicago, $5.05; crushed, $4.75; Walston, $5; New River, $5.

Pittsburg. July 16.

(From our Special Correspondent.)

Coal.—There has been a fair trade during the week. As noticed in our last report, the rise promised by the Signal Service came to hand on time. The Davis Island dam wickets were let down and the all loaded coal, about 4,000,000 tons, passed down the Ohio, destined for the Western and Southern market. The lower markets contain a fair supply. Mining will be continued along the Monongahela Valley as long as there are empties to load. There will probably be a coal strike in the fall, as the coalmen have about decided to reduce the price of mining to 3 cents; the miners say a strike will follow.

Connellsville Coke.—The market continues to show a downward tendency. Production is birng curtailed; the falling off in shipments during the past four weeks amounts to 1,811 tons. The adjustment of labor affairs affecting iron industries was expected to enliven trade, but so far has had no material effect. The works of Frick & McClure were idle two days last week, as were many others. The plants were all idle on Saturday. Operations will be further restricted, and the Kyle, White, Morgan, Summitt, and Eagle plants of Frick's will be idle four days, being operated only on Monday and Tuesday. The other Frick plants will be run five days straight. The McClure plants Haslett, Enterprize, and Diamond are idle. The coke yards are being kept free of stock coke, and there is not much surplus. Despite the decline in shipment, trade cannot be said to be dull, and it is better than usual at this season. There are now about 13,400 active ovens, none having shut down since last report. Shipments for the week aggregated 5,261 cars, consigned as follows: To Pittsburg and river points, 1,675; points west of Pittsburg, 2,689; east of Connellsville, 897. This is quite a falling off from the previous week. The rates on furnace coke are $1.90; foundry, $2.30; crushed, $2.65. Freights show no change.

METAL MARKET.

Prices of Silver Per Ounce Troy.

NEW YORK, Friday Evening, July 17, 1891.

July	Sterling Exch'ge.	Lond'n Pence.	N. Y. Cts.	July	Sterling Exch'ge.	Lond'n Pence.	N. Y Cts.
11	4.86¾	45⅞	100¼	15	4.86½	46¼	101
13	4.86¾	45⅞	100⅜	16	4.86¾	46¼	100⅞
14	4.86¾	46	100½	17	4.86¾	46	100¾

Silver closes lower, under the influence of large offerings on the market. It is believed, however, in well-informed circles, that the demand for India in the autumn will be very large, and higher prices are expected.

The United States Assay Office at New York reports the total receipts of silver for the week to be 127,000 ounces.

Government Silver Purchases.

WASHINGTON, D. C., July 17.—*(By Telegraph.)*—The Treasury Department purchased 400,000 ounces of silver to-day at prices ranging from $1·00875 to $1.01 per ounce.

Silver Bullion Certificates.

	Price. H.	Price. L.	Sales.
July 11	100½	100⅜	15,000
July 13	100⅝	100½	198,000
July 14	101¼	100⅝	325,000
July 15	101¼	101	120,000
July 16	101⅛	101	140,000
July 17	101¼	100½	45,000
Total sales			843,000

Domestic and Foreign Coin.

The following are the latest market quotations for American and other coin:

	Bid.	Asked.
Trade dollars	$ .78	$ .79
Mexican dollars	.78	.79
Peruvian soles and Chilian pesos	.75½	.77
English silver	4.86	4.90
Five francs	.94	.95
Victoria sovereigns	4.90	4.93
Twenty francs	3.87	3.90
Twenty marks	4.74	4.78
Spanish doubloons	15.55	15.70
Spanish 25 pesetas	4.78	4.83
Mexican doubloons	15.55	15.70
Mexican 20 pesos	19.50	19.60
Ten guilders	3.96	4.00
Bar silver	1.00¾	1.01½

Foreign Bank Statements.

The governors of the Bank of England at their weekly meeting on Thursday made no change in its minimum rate of discount, which remains at 2½%. In the week the bank lost £1,092,000 bullion, and the proportion of reserve to liabilities was lowered from 40·24% to 39·03%, against an advance from 34·81% to 34·87% in the corresponding week last year, when its discount rate was unchanged at 4%. The weekly statement of the Bank of France shows an increase of 12,375,000 francs in gold and a decrease of 2,950,000 francs in silver.

Copper.—The market has been lifeless and we have hardly a change to chronicle. The business done was not of an important nature, but was at steady prices. Indications all point to one important fact, namely, that consumers are only lightly stocked. Lake copper is still held by first hands at 13c., while ingot copper in store in New York is obtainable from second hands at somewhat below this figure. Arizona copper is not offered at all, and casting is remarkably scarce and held for higher figures, say 12¼c. for carload lots, and 12⅝@12¾c. for smaller quantities.

From Europe a good demand is still reported, and it appears that lately India has taken quite large quantities. Nevertheless G. M. B. copper experienced a not inconsiderable decline, and this is mainly attributed to the heavy offerings of fine copper, especially Lake. We close to-day at £53 15s., cash; £54 5s. three months. Considering the excellent statistical position of the article this is somewhat surprising, but it is anticipated that as soon as the pressure to sell abates somewhat values will harden again. Statistics are cabled as having increased 500 tons for the first half of this month, and this is no doubt on account of the heavy arrivals of American copper, as shipments from this side have been unusually large.

We quote: English Tough, £56@£56 10s.; Best Selected, £57@£57 10s.; Strong Sheets, £61@£61 10s.; India Sheets, £65@65 10s.; Yellow Metal Sheets, 5¾d.

The exports of copper from the port of New York during the past week were as follows:

		Lbs.	
To Antwerp—	Copper.		
S. S. Waesland	30 casks.	11,200	$1,342
To Havre—			
S. S. La Gascogne	90 casks.	122,124	13.550
" "	529 pigs.	142,652	18,000
" "	918 bars.	125,464	16,314
To Rotterdam—			
S. S. Veendam	356 casks.	112,004	12,400
To Liverpool—	Copper Matte.	Lbs.	
S. S. Wyoming	2.080 bags.	243,540	15,000
" The Queen	2.233 "	241,239	15 000
" Britannic	4,197 "	473,000	30.000
" Arizona	2.208 "	240,846	16,000
" Runic	7,246 "	804,175	50,000
	Copper.		
S. S. The Queen	145 casks.	180,750	21.300
" " "	1,130 pigs.	291.770	36,150
" " "	218 bars.	77,650	9.000
" Runic	276 pigs.	40.350	4,075
To Hamburg.	Copper.	Lbs.	
S. S. Rhaitia	17 bars.	2,330	280

Tin.—In spite of the London market being rather dull, values have been fairly well maintained here, as the spot stocks are exceedingly small. At the exchange a few isolated transactions took place at about 20.40@20·50c., but at these prices dealers are not selling, holding firmly for 20⅝c. to 20·75c. Futures are obtainable at about the same rates.

The London market has been rather irregular and prices are slightly lower than last week, being £91 15s. for spot and £92 for futures against £92 5s. and £92 10s. respectively last week. Shipments from the East Indies are cabled as 900 tons to the United States and only 100 tons to England, for the first half of this month, the total being rather below the average

Lead has been very steady and prices well maintained. The transactions amount to about 500 to 700 tons, and we have to quote for delivery in New York 4·40c to 4·42½c. In the West the article appears to be exceedingly scarce, and comparatively high rates are obtainable out there, and smelters are asking for shipment about 7½c. to 10c. more. We quote English £12 12s. 6d., Spanish £12 7s. 6d.

St. Louis Lead Market.—The John Wahl Commission Company telegraphs us as follows: "Lead is very quiet. Trading is on a very limited scale. The nominal price for both spot and futures is 4·25c.@4·27½c."

Spelter continues rather unsatisfactory; the demand from consumers is slack, and the few orders placed were executed at lower prices. It certainly appears to be rather difficult to effect any sales at all. Carload lots are reported as having been sold at 5·02½c., delivered New York, at which price there are further sellers, and larger quantities are obtainable below this figure. Production in the West seems to have increased rather considerably of late, and this is likely to tell on prices.

In the London market specials are quoted at £23 12s. 6d. and ordinaries at £23 10s.

Antimony is dull with not much doing. We quote Cookson's 13½c., L. X. 12½c. and Hallett's 11⅞@12c.

Nickel.—There appear to be hardly any stocks here. A good demand has sprung up for near delivery, which can only be partly supplied. We have to quote for present delivery 68@70c., according to brand and quantity.

Quicksilver.—There is no change from previous quotations of $43 and £7 15s. London. The market is very dull.

IRON MARKET REVIEW.

NEW YORK, Friday Evening, July 17.

The situation in the iron market continues unchanged, business having been quiet in nearly all centres during the past week. The number of rolling mills that are idle for summer repairs and pending settlement of the wage schedule recently presented by the Amalgamated Association of Iron and Steel Workers contributes to the general dullness. Most of the mills have agreed to the new scale, however, and many are now preparing to resume work again.

An important feature in connection with the prevailing situation in the market is the number of furnaces that blew in during June and the consequent great increase in production. On May 1st 227 furnaces were in blast; on June 1st, 258, and on July 1st, 293, which was about the same number as in the first of the year, before restriction was commenced. The weekly capacity of furnaces in operation on the first of that month was about 147,000 tons; on the first of the current month about 171,000 tons. The general condition of the market does not indicate that there has been a corresponding increase in consumption, and unless demand improves rapidly we are likely to see another accumulation of stocks.

American Pig Iron.—The market is stagnant and the only feature of interest during the week has been the sale of some Northern No. 2 foundry iron, from warrant yards, at $15.. This transaction is not considered to have any particular significance, however, as this iron has been pressing for sale for some time. The news bureaus have reported the shipment of 400 tons of iron from Detroit, Mich., to Liverpool, as the first contract ever recorded for the carriage of American pig iron to Europe. This is erroneous. As a matter of fact there is nothing new in this shipment, several lots having gone from this port in the past two or three years. The iron shipped is a charcoal iron of superior grade, used by an English manufacturer near Liverpool for special purposes.

We quote Northern No 1, $17@$18; No. 2x, $16@$17; Southern, No. 1x, $17@$18; No. 2x, $16@$17.

Spiegeleisen and Ferro-manganese.—A sale of 5,000 tons of imported spiegeleisen, 10% to 12%, to an Eastern mill, on private terms, is reported. The market, generally is dull. We quote: Spiegeleisen, 20%, $27.50@$28; ferro-manganese, 80%, $64@$65.

Steel Rails.—We hear of no transactions of consequence. The market seems to show no signs of immediate improvement, and inquiries are unimportant. We continue to quote $30 at mills, $30.75 at tidewater.

Rail Fastenings.—There is no change. We quote: Spikes, $2@$2.10; angle plates, 1·70@1·80c; bolts and square nuts, 2·75@2·85c.; hexagonal nuts, 2·95c.; complete joint, iron and steel, acording to weight.

Tubes and Pipe.—Business moves along at about the usual rate. An account of the reorganization of the National Tube Works Company will be found in another column. We quote discounts on carload lots as follows: 47½% on butt, black; 40% on galvanized: 60% on lap, black; 47½% on lap, galvanized; boiler tubes, 50% on all sizes; casing, all sizes, 50%.

Structural Material.—There seems to be rather more activity in this market. A considerable number of small orders have been placed, making the total volume of business very fair. Prices remain unchanged and we quote: Universal plates, $2.25; bridge plates, $2.10; beams, $3.10.

Merchant Steel.—The market has shown decided improvement during the past week, and there is a considerable amount of business doing. Prices continue unchanged. We quote as follows: Best English tool, 15c., net; American tool steel, 7@8c.; special grades, 13@20c.; crucible machinery steel, 5c.; crucible spring, 3¾c.; open-hearth machinery, 2·50c.; open-hearth spring, 2·60c.; tire steel, 2·50c.; toe calks, 2·50c.; first-quality sheet, 10c.; second-quality sheet, 8c.

Old Rails.—Nothing doing. Quotations nominally $21@$22.

Wrought Iron Scrap.—The market is lifeless. We quote $21@$22 at yards.

Chicago. July 16.

(From our Special Correspondent.)

The crude iron market seems to be in a more healthy condition generally and furnace agents are feeling much encouraged over the situation, feeling assured of a radical revival and a large demand during the fall.

The strike of the architectural iron makers is still on, but work on all the large buildings progresses favorably. The steel rail mills are running full and are feeling much encouraged by the nature of the inquiries now received from railroads, some of which are urging quicker deliveries of orders placed in May and June. Manufactured iron and steel are in fair demand and in plates some activity is noted. Old material of all kinds is still very quiet and much railroad-shop stuff is offered.

Pig Iron.—The week just closed made a fair showing in demand for coke iron from carloads upward to hundred-ton lots, and in several instances orders were booked for larger quantities up to a thousand tons. Much of the smaller busi-

ness in this line was for quick shipment. Lake Superior charcoal is quiet just at present, with few if any weak spots, and several lots were disposed of to outside parties at equal to $18 Chicago. Some agricultural-implement makers are already asking for deliveries of iron on contracts which do not go into effect until August, and the crops have been such that most of their stocks of finished goods are well cleaned up. A moderate demand is noted for softeners in small quantities for prompt shipment. Southern iron is more firm, and some scarcity is noticed in No. 1 soft. Grade is healthy and the outlook encouraging.

Quotations per gross ton f. o. b. Chicago are: Lake Superior charcoal, $17.50@$18; Lake Superior coke, No. 1, $15.75@$16; No. 2, $15.25@$15.75; No. 3, $14.25@$14.50; Lake Superior Bessemer, $17.50; Lake Superior Scotch, $17@$17.50; American Scotch, $18@$18.50; Southern coke, Foundry No. 1, $16; No. 2, $15.25; No. 3, $14.50; Southern coke, soft, No.1, $15.50; No. 2, $14.50; Ohio silveries, No. 1, $18; No. 2, $17; Ohio strong softeners, No. 1, $18.50; No. 2, $17; Tennessee charcoal, No. 1, $17.50; No. 2, $17; Southern Standard Car Wheel, $21@$22.50.

Structural Iron and Steel.—Inquiry continues good, but is not as proportionate to the capacity of works as it was last year. Material for the Maller's building was contracted last week—12 stories, fireproof, cast-iron columns and steel beams, aggregating nearly 450 tons. Quotations for car lots f. o. b. Chicago are as follows: Angles, $2@$2.10; tees, $2.60@$2.70; universal plates, $2.35@$2.45; sheared plates, $2.30@$2.40; beams and channels, $3.20.

Plates.—Business generally from all quarters is quite good, and should this continue, and there is every reason to believe it will, prices may harden. Quotations remain unchanged: Steel sheets. 10 to 14, $2.70@$2.80; iron sheets, 10 to 14, $2.60@$2.70; tank iron or steel, $2.50@$2.70; shell iron or steel, $3@$3.25; firebox steel, $4:25@$5.50; flange steel, $3.25@$3.40; boiler rivets, $4.25; boiler tubes, 2¾ in. and smaller 55%, 3 to 6 in. 65%, 7 in. and upward 55%.

Merchant Steel.—A fair demand continues from the implement trade, and we hear of a few contracts placed during the past week, with more to follow in the very near future. There is a growing confidence and a manifest feeling of firmness on the part of sellers. Good steel is in moderate request. Prices remain unchanged: Tool steel, $6.75@$7; tire steel, 2.30@$2.50; toe calk, $2.50@$2.65; Bessemer machinery, $2.20@$2.30; Bessemer bars, $2@$2.10; open-hearth machinery, $2.60@$2.75: open-hearth spring, $2.75@$3; crucible spring, $3.75@$4.

Steel Rails.—Inquiry for small lots for prompt shipment continues fair. The week opened with several inquiries aggregating 6,000 tons, and sales of carloads by Eastern mills are more or less frequent at $32.75@$33, Chicago. There is an evident desire for, and some roads are requiring and urging, quicker deliveries of rails. For desirable orders $31 is quoted; on all others $31.50@$32.50c. Other track supplies are in good demand. Splice bars at $1.95@$2 for steel and $1.85@$1.95 for iron, and spikes at $2.05@$2.10 per 100 lbs.; track bolts, hexagonal nuts, $2.85@$2.90.

Galvanized Sheet Iron.—Trade is quite irregular, some weeks good and falling off the next. Discounts are unchanged at 67½% off on Juniata and 67½% and 5% off on charcoal.

Black Sheet Iron.—Some few orders have been placed for the lighter gauges for delivery during next two months at 2·90c. for No. 27. Chicago dealers quote 3·20c., same gauge.

Bar Iron.—Some of the agricultural-implement makers who have not placed orders are now inquiring. Demand generally for manufacturing consumers is steadily improving. Local mills continue to quote 1·68@1·70c., though one of them is shading these figures on desirable specifications. Dealers quote 1·80@1·90c. rates.

Nails.—Wire nails are in better inquiry, and mill agents are now firm at $1.95 at mill. Steel cut nails are in good demand from local and near-by mills, which are selling at lower quotations than Wheeling manufacturers. Jobbing demand is light at $1.75@$2.15 for wire nails.

Scrap.—Demand from dealers is very limited for all grades, and prices mostly nominal. Offerings from railroads continue quite large.

We quote per net ton f. o. b. Chicago: No. 1 railroad, $18.50; No. 1 forge, $18; No. 1 mill, $14; fishplates, $21; axles, $23; horse shoes, $18; pipes and flues, $13; cast borings, $8; wrought turnings, $10.50; axle turnings, $12.50; machinery casting, $11.50; stove plates, $8; mixed steel, 11; coil steel $15.50; leaf steel, $15.50; tires, $17.

Old Rails and Wheels.—Iron rails are quotable at $23; steel rails at $14.50@$16.50 with a few sales of selected lengths at the latter figures. Car wheels are stagnant at $16; it is doubtful if a dollar less would move them to any extent.

Louisville. July 11.

(Special Report by Hall Bros. & Co.)

The general review of the market for several weeks past will answer now, no change of importance having taken place in the last week. All orders, whether for long or short deliveries, are promptly met by some one and at low figures, and many of them at liberal concessions. There is no definite time fixed yet for the idle mills to resume work, and it is claimed that there is very little encouragement in the outlook for them to resume now. The prospects for improvement in iron circles depends mainly upon the outcome of the crop harvest, but it will be some time yet before this can be even fairly approximated, and in view of the uncertainty always attending the outcome of this, hopes of improvement are necessarily based upon guesswork now. Should the crops hold out to general expectations, it will give big employment to railroads, which will necessitate a large line of repairs of old stock as well as placing orders for new cars, and under these circumstances various branches of the iron industry will be benefited. We quote:

Hot Blast Foundry Irons.—Southern coke, No. 1, $14.25@$14.50; No. 2, $13.75@$14; No. 3, $13.25@$13.50. Southern charcoal, No. 1, $16.50@$17; No. 2, $16@$16.50. Missouri charcoal, No. 1, $17@$17.50; No. 2, $16.50@$17.

Forge Irons.—Neutral coke, $12.50@$13; cold short, $12.50@$13; mottled, $12@$12.25.

Car Wheel and Malleable Irons.—Southern, standard brands, $19.50@$20; Southern, other brands, $17.50@$18. Lake Superior, $20.50@$21.50.

Philadelphia. July 16.

(From our Special Correspondent.)

Pig Iron.—The week's business has shown that buyers have been somewhat more active, though making no very large purchases. The condition of stocks is being watched a little more carefully in order to profit by any favorable opportunities that may arise. Buyers all feel that there will be more business transacted and more work done during the last half of the year than the first half, and they know that the stocks of iron are very small and that any active buying would soon develop some strength in prices. This is why they are watching a little more closely than usual. The general resumption of work in the iron mills goes to show that the consumption of iron will increase. Quotations are for No. 1 standard brands, prompt delivery, $17.50@$18; for No. 2 standard brands, 30 days delivery, $16@$16.50. Higher prices are named for a few brands. For forge iron, ruling quotations are $14.50@$15, for Bessemer, $17@$18 for standard.

Foreign Material.—Quotations are given at $64@$65, with no heavy sales.

Steel Billets.—Two or three brokers have succeeded in negotiating contracts for two or three large orders for September delivery for steel billets on a basis of $28, near-by points. Consumers are following the policy of keeping their stocks pretty well up, so as not to be caught by accidental market fluctuations.

Muck Bars.—The resumption of work at a number of mills has given an air of activity to this department of the iron trade. Brokers who are acting as agents for two or three mills say that the past few days have brought out quite a number of orders from large buyers, and that selling prices are very little under $27.

Merchant Iron.—A number of the bar mills have started up, though many are still idle, and will not probably resume for a couple of weeks. Demand for merchant bar is by no means urgent, though the mills are shipping about all they make. Best refined is quoted at $1 80@$1.75; medium, $1.70. Car builders are negotiating with three or four interior mills, and will probably not pay over $1.60 for the particular kind of iron they want.

Nails.—The nail trade is in a rather dilapidated and unsatisfactory condition. There are more nails being used just at this time than for several months, but the stocks are so large that prices are not in the least affected.

Sheet Iron.—The sheet-iron mills are making more sheet, but the demand is not such as to warrant higher prices; the chief activity is in galvanized.

Wrought-Iron Pipe.—A steady, moderate demand for wrought-iron pipe continues at card rates or a little less. At a meeting held last Thursday prices were reaffirmed, but small cuts are frequently made on large-sized orders.

Plate and Tank Iron.—Only a moderate amount of business has been done during the past week. There are large buyers who would place orders if an advantage of about $2 per ton were given, but mill men, instead of shading $2, would like to see that much money put on prices as a simple matter of justice. A few shipbuilders' orders will probably be given out in a few days. Bridge builders are using up a great deal of material, but are slow about buying in advance.

Structural Material.—Angles and beams are selling at the same price they have been for months. The fact that a great deal of material will be wanted this fall does not seem to help the market in the least; the chief reason is that there is a great deal of anxiety for business, and this anxiety is likely to increase rather than grow less. Angles are 2c.; tees, 2·50c.; beams, 3·10c.

Steel Rails.—Steel rail quotations are given at $30 in large lots. No important information is to be had at present. This is about the time when several large orders were promised, but according to statements of rail makers and brokers, nothing worthy of special comment has been done.

Old Rails.—Brokers are offering old rails at $21@$21.50.

Pittsburg. July 16.

(From our Special Correspondent.)

Raw Iron and Steel.—We have reached the middle of July, and wirh respect to the iron and steel business trade shows up remarkably well, so far as the volume of trade is concerned. Prices of Bessemer, grey forge and foundry iron rule low, however, compared with same time last year, as will be seen by the following:

1890, July 17.		1891, July 17.	
Bessemer	$19.30@19.50	Bessemer	$16.25@16.50
Grey Forge.	15 50@15.75	Grey Forge	14 00@14.25
No. 1 Foundry	17.50@17.60	No. 1 Foundry	16.00@16.50
No. 2 Foundry	16.50@16.60	No. 2 Foundry	15.00@15.25
Mottled&White	15.25@15 50	Mottled&White	13.50@13.75

Prices at present are remarkably low, and that may be the reason for the sales being so liberal at this time.

The stock of standard iron is by no means large; city furnaces are well sold up, and are showing no particular anxiety to sell.

Compared with previous years the July sales are far in excess of any previous year, notwithstanding the fact that a large number of mills are closed, taking stock and making repairs. One fact seems evident, buyers would scarcely make the liberal purchases they have, unless their minds were made up that the present time was the most desirable one to purchase for the fall and winter trade. A well informed Eastern iron man says: "Prices are generally firm, notwithstanding the limited volume of business, as the dullness is but temporary and usual at this time of the year. Consumers of both crude and finished irons are buying only in a small way and there is no disposition on the part of mill and furnace operators to force business. The trade generally is in a healthy condition."

Southern iron has been neglected for some time past; in order to effect sales prices have to be materially shaded. Shenango and Mahoning Valley iron is held firmly, prices being well maintained. The situation may be summed up as follows: Bessemer pig on the down grade; grey forge firm at outside rates; steel billets and slabs hold their own; new steel rails firm at $30 at the works; scrap material lower; old steel rails fair, particularly long lengths; other descriptions maintain previous figures.

Coke Smelted Lake and Native Ores.

3,500 Tons Bessemer, Aug., Sept	$16.50 cash.
3,000 Tons Bessemer, Aug., Sept	16.45 cash.
3,000 Tons Bessemer	16.25 cash.
2,500 Tons Grey Forge, July, Aug., Sept	14.20 cash.
2,000 Tons Bessemer, July, Aug	16.50 cash.
2,000 Tons Bessemer	16.50 cash.
1 500 Tons Bessemer, Sept	16.45 cash.
1,500 Tons Grey Forge	14.00 cash.
1,500 Tons Grey Forge	14.15 cash.
1,000 Tons Grey Forge, August	16.50 cash.
1,000 Tons Grey Forge	14.00 cash.
1,000 Tons Bessemer, August, Sept	16.50 cash.
1,000 Tons Bessemer, July	16.50 cash.
1,000 Tons White and Mottled	13.50 cash.
500 Tons Grey Forge	14 25 cash.
500 Tons Bessemer, Aug., Sept	16.50 cash.
500 Tons Grey Forge at Valley furnace	13.80 cash.
500 Tons Grey Forge, spot	14.25 cash.
500 Tons Grey Forge Valley del	14.00 cash.
300 Tons Grey Forge, all ore	15.25 cash.
200 Tons Grey Forge, all ore	15.00 cash.
100 Tons No. 2 Foundry, all ore	16.75 cash.
100 Tons No. 1 Foundry	16.50 cash.
100 Tons No. 3 Foundry	14.75 cash.

Steel Slabs and Billets.

2,500 Tons Steel Billets, Aug., Sept., Oct	26.50 cash.
2,000 Tons Rod Billets, Aug., Sept	26.50 cash.
1,500 Tons Billets and Slabs	26.25 cash.
1,200 Tons Billets	26.00 cash.
1,000 Tons Billets	26.50 cash.
500 Tons Billets and Slabs	26.25 cash.

Muck Bars.

2,000 Tons Neutral	27.00 cash.
750 Tons Neutral, Sept	27.30 cash.
500 Tons Neutral, July	27.00 cash.
500 Tons Neutral, Aug., Sept	27.25 cash.
500 Tons Neutral	27.00 cash.

Ferro-Manganese.

350 Tons 80%, Domestic Pittsburg	66.50 cash.
75 Tons 80%, Seaboard	64.00 cash.
50 Tons 80%, Baltimore	63.40 cash.

Steel Wire Rods.

1,000 Tons American fives	36.65 cash.
500 Tons American fives	36.50 cash.

Skelp Iron.

1,200 Tons Wide Grooved	1.65 4 m.
800 Tons Sheared Iron	1.87½ 4 m.
600 Tons Narrow Grooved	1.62½ 4 m.

Bloom, Beam and Rail Ends.

1,000 Tons Rail Ends	17.50 cash.
500 Tons Billet Ends	18.00 cash.
500 Tons Bloom and Beam Ends	18.12½ cash.

Old Iron and Steel Rails.

1,000 Tons Long Steel Rails	18.75 cash.
600 Tons Long Steel Rails	19.00 cash.
500 Tons American T's	23 00 cash.

Scrap Material.

200 Tons No. 1 W. Scrap, Net	$18.50 cash
150 Tons No. W. Scrap, Net	18.00 cash
150 Tons Steel Rails, Short, Gross	18.00 cash
100 Tons O. H. Steel, Gross	17.00 cash
100 Tons Old Iron Rails, Gross	22.50 cash
100 Tons W. I. Turnings, Net	15.00 cash
100 Tons Cast Scrap, Gross	13.75 cash
100 Tons No. 1 W. Scrap, Net	19.00 cash

DIVIDEND-PAYING MINES.

	Name and Location of Company.		Capital Stock.	Shares. No.	Shares. Par	Assessments. Total levied.	Assessments. Date and Amount of last			Dividends. Total paid.	Dividends. Date & amount of last.		
1	Adams, s. L. c.	Colo.	$1,500,000	150,000	$10	*	.....	..	.....	$585,000	June	1891	.05
2	Alice, s.	Mont.	10,000,000	400,000	25	*	.....	.....	.....	920,000	April	1891	.06½
3	Alma & Nel Wood., g	Idaho	300,000	30,000	10	*	.....	.....	.....	60,000	Jan.	1889	50
4	Amador, g.	Cal.	1,250,000	250,000	5	*	.....	.....	.....	31,250	Aug.	1890	.12½
5	American Belle, s.g.c	Colo.	2,000,000	400,000	5	*	.....	.....	.....	50,000	April	1891	.12½
6	Americ'n & Nettie, g.s	Colo.	.....	300,000	...	.....	.....	.....	.....	150,000	Nov.	1889	.10
7	Amy & Silversmith, s.	Mont.	.....	341,419	...	.....	.....	.....	.....	247,580	Aug.	1887	.12½
8	Atlantic, c.	Mich.	1,000,000	40,000	25	$280,000	April	1875	$1.00	700,000	Feb.	1891	1.00
9	Argenta, s.	Nev.	10,000,000	100,000	100	335,000	July	1889	.10	40,000	Feb.	1890	.30
10	Aspen Mg. & S., s. L.	Colo.	2,000,000	200,000	10	*	.....	.....	.....	660,000	May	1891	.10
11	Aurora, I.	Mich.	2,000,000	100,000	20	.....	.....	.....	.....	255,000	Mar.	1891	1.00
12	Badger, s.	Ont.	250,000	50,000	5	.....	.....	.....	.....	37,500	Mar.	1890	.25
13	Bangkok Cora-Bell, s.	Colo.	600,000	600,000	1	*	.....	.....	.....	44,510	Aug.	1890	.00½
14	Belle Isle, s.	Nev.	10,000,000	100,000	100	190,000	Dec.	1889	.15	300,000	Dec.	1879	.25
15	Belcher, s. G.	Nev.	10,400,000	104,000	100	2,978,000	Feb.	1891	.50	15,397,000	April	1876	1.00
16	Bellevue, Idaho, s. L.	Idaho	1,250,000	125,000	10	120,000	Dec.	1889	.25	200,000	Jan.	1890	.10
17	Bi-Metallic, s. G.	Mont.	5,000,000	200,000	25	.....	.....	.....	.....	760,000	June	1891	.35
18	Bodie Con., G. I.	Cal.	10,000,000	100,000	100	550,000	June	1890	.25	1,602,572	April	1885	.50
19	Boston & Mont., G.	Mont.	2,500,000	250,000	10	*	.....	.....	.....	520,000	June	1886	.15
20	Boston & Mont., c. s.	Mont.	2,500,000	100,000	25	*	.....	.....	.....	1,825,000	May.	1891	1.00
21	Breece, I.	Colo.	5,000,000	200,000	25	.....	.....	.....	.....	2,000	Feb.	1880	.01
22	Brooklyn Lead, L. S.	Utah	500,000	50,000	10	.....	.....	.....	.....	127,000	July	1887	.05
23	Bullion, Beck. & C., s. L.	Utah	1,000,000	100,000	10	.....	.....	.....	.....	730,000	Nov.	1890	.50
24	Buiwer, G.	Cal.	10,000,000	100,000	10	130,000	Aug.	1889	.25	175,000	Jan.	1884	.10
25	Bunker Hill & S.s.L.	Idaho	3,000,000	300,000	10	*	.....	.....	.....	150,000	Oct.	1883	.06⅔
26	Caledonia, G.	Dak.	10,000,000	100,000	100	505,000	May	1885	.15	192,000	Oct.	1890	.08
27	Calliope, s.	Colo.	1,000,000	1,000,000	...	.....	.....	.....	.....	140,000	Jan.	1891	.00½
28	Calumet & Hecla c.	Mich.	2,500,000	100,000	25	1,300,000	.....	.....	.....	35,850,000	June	1891	5 00
29	Catalpa, s. L. I.	Colo.	3,000,000	300,000	10	*	.....	.....	.....	270,000	May	1884	10
30	Centen'l-Eureka, s. L.	Utah	1,500,000	30,000	50	.....	.....	.....	.....	352,500	July	1891	2.00
31	Central, c.	Mich.	500,000	20,000	25	100,000	Oct.	1861	.65	1,970,000	Feb.	1891	1.00
32	Chrysolite, s. L.	Colo.	10,000,000	200,000	50	*	.....	.....	.....	1,650,000	Dec	1884	.25
33	Clay County, G.	Colo.	200,000	200,000	1	*	.....	.....	.....	36,000	June	1891	.02
34	Cœur D'Alene, s. L.	Idaho	5,000,000	500,000	10	*	.....	.....	.....	270,000	Aug.	1891	.02
35	Colorado Central, s. L.	Colo.	2,750,000	275,000	10	*	.....	.....	.....	406,250	Aug.	1889	.05
36	Commonwealth, s.	Nev.	10,000,000	100,000	100	170,000	Nov.	1888	.50	20,000	Nov.	1890	.30
37	Confidence, s. L.	Nev.	.....	24,960	...	328,880	May	1890	.75	199,680	April	1889	1.00
38	Cons. Cal. & Va., s. G.	Nev.	21,600,000	216,000	100	108,000	Jan.	1885	.30	3,466,800	April	1890	.25
39	Contention, s.	Ariz.	12,500,000	250,000	50	.....	.....	.....	.....	42,587,500	Dec.	1884	.25
40	**Cop. Queen Con., c.	Ariz.	1,400,000	140,000	10	.....	.....	.....	.....	210,000	Feb.	1889	.50
41	Cortez, s.	Nev.	1,500,000	300,000	05	*	.....	.....	.....	481,000	Feb.	1891	.46
42	Crescent, s. L. G.	Utah	15,000,000	600,000	25	*	.....	.....	.....	228,000	Oct.	1888	.03
43	Crown Point, G. s.	Nev.	10,000,000	100,000	100	2,425,000	Sept.	1889	.50	11,585,000	Jan.	1875	2.00
44	Cumberland, L. s.	Mont.	5,000,000	500,000	10	*	.....	.....	.....	15,000	Nov.	1889	.03
45	Daly, s. L.	Utah	3,000,000	150,000	20	.....	.....	.....	.....	1,987,500	June.	1891	.25
46	Deer Creek, s. G.	Idaho	1,000,000	200,000	5	*	.....	.....	.....	20,000	June	1889	.05
47	Deadwood-Terra, G.	Dak.	5,000,000	200,000	25	*	.....	.....	.....	1,000,000	Nov.	1887	.10
48	Derbec B. Grav., G.	Cal.	10,000,000	100,000	100	90,000	Dec.	1881	.10	240,000	Oct.	1890	.10
49	Dunkin, s. L.	Colo.	5,000,000	200,000	25	*	.....	.....	.....	390,000	Oct.	1888	.05
50	Dunstone, G. S. L.	Mont.	1,000,000	200,000	5	*	.....	.....	.....	6,000	Nov.	1888	.03
51	Eclipse, L. S.	Colo.	100,000	100,000	1	.....	.....	.....	.....	20,000	Nov.	1887	10
52	Elkhorn, s. L.	Mont.	1,000,000	200,000	5	*	.....	.....	.....	$396,000	June	1891	1.00
53	Enterprise, s.	Colo.	100,000	10,000	10	*	.....	.....	.....	40,00	May.	1888	1.00
54	Eureka Con., s. L. G.	Nev.	5,000,000	50,000	100	550,000	June	1889	.50	4,892,500	Oct.	1890	.25
55	Evening Star, s. L.	Colo.	500,000	50,000	10	*	.....	.....	.....	1,450,000	Dec.	1889	.25
56	Father de Smet, G.	Dak.	10,000,000	100,000	100	200,000	Nov.	1878	1.00	1,125,000	Dec.	1885	.20
57	Franklin, c.	Mich.	1,000,000	40,000	25	220,000	June	1871	.....	1,046,000	July.	1891	2.00
58	Freeland, s. G.	Colo.	5,000,000	200,000	25	*	.....	.....	.....	190,000	July.	1886	.10
59	Garfield Lt., G. s.	Nev.	500,000	100,000	5	.....	.....	.....	.....	90,000	April	1888	.12½
60	Gould & Curry, s. G.	Nev.	10,800,000	108,000	100	3,988,800	Sept.	1890	.25	3,826,800	Oct.	1870	10.00
61	Grand Prize, s.	Nev.	10,000,000	100,000	100	785,000	Jan.	1890	.30	495,000	Mar.	1884	.25
62	Granite, s. L.	Idaho	500,000	500,000	1	*	.....	.....	.....	28,400	Oct.	1889	.02
63	Granite Mountain, s.	Mont.	10,000,000	400,000	25	.....	.....	.....	.....	11,000,000	June	1891	.25
64	Green Mountain, G.	Cal.	1,250,000	125,000	10	*	.....	.....	.....	212,000	Nov.	1881	.07½
65	Hale & Norcross, G. s.	Nev.	11,200,000	112,000	100	5,142,800	April	1890	.50	1,822,000	Aug.	1888	.50
66	Hecla Con., s. G. L. C.	Mont.	1,500,000	30,000	50	*	.....	.....	.....	1,650,000	June	1891	.50
67	Hel'a Mg. & Red, s. L. G.	Mont.	3,315,000	663,000	5	*	.....	.....	.....	197,970	July.	1886	.06
68	Holmes, s.	Nev.	10,000,000	100,000	100	370,000	May	1890	.25	75,000	April	1886	.25
69	Homestake, G.	Dak.	12,500,000	125,000	100	200,000	July	1878	1.00	4,718,750	July	1891	.10
70	Honorine, s. L.	Utah	500,000	250,000	2	37,500	April	1889	.05	125,000	Sept.	1887	.05
71	Hope, s.	Mont.	1,000,000	100,000	10	*	.....	.....	.....	233,252	April	1888	.25
72	Horn-Silver, s. L.	Utah	10,000,000	400,000	25	*	.....	.....	.....	4,300,000	June	1891	.12½
73	Hubert, G.	Colo.	1,000,000	1,000,000	1	*	.....	.....	.....	247,000	Dec.	1889	.00½
74	Idaho, G.	Cal.	310,000	3,100	100	.....	.....	.....	.....	5,294.45	June	1891	3.00
75	Illinois, s.	N. M.	100,000	100,000	1	*	.....	.....	.....	45,000	April	1889	.20
76	Iron Hill, s.	Dak.	2,500,000	250,000	10	134,000	July	1889	.03	156,250	Nov.	1887	.07½
77	Iron Mountain, S.	Mont.	500,000	500,000	1	*	.....	.....	.....	120,000	Feb.	1891	.05
78	Iron-Silver, s. L.	Colo.	10,000,000	500,000	20	*	.....	.....	.....	2,500,000	April	1889	.20
79	Jackson, G. S.	Nev.	5,000,000	50,000	100	237,500	Nov.	1890	.20	60,000	Jan.	1891	.10
80	Jay Gould, G. S.	Mont.	2,000,000	40,000	50	*	.....	.....	.....	459,000	May	1890	.04
81	Kearsarge, c.	Mich.	1,000,000	40,000	25	190,000	Oct.	1887	1.00	50,000	Jan.	1890	2.00
82	Kentuck, s. G.	Nev.	3,000,000	30,000	100	417,439	Dec.	1890	.35	1,350,000	Dec.	1886	.10
83	La Plata, s. L.	Colo.	2,000,000	200,000	10	*	.....	.....	.....	610,000	Sept.	1882	.30
84	Leadville Con., s. L.	Colo.	4,000,000	400,000	10	*	.....	.....	.....	423,000	April	1887	.05
85	Lexington, G. S.	Mont.	4,000,000	40,000	100	*	.....	.....	.....	565,000	Jan.	1885	2.00
86	Little Chief, s. L.	Colo.	10,000,000	200,000	50	*	.....	.....	.....	830,000	Dec.	1890	.05
87	Little Rule, s.	Colo.	500,000	500,000	1	*	.....	.....	.....	160,000	Dec.	1891	.02
88	Mammoth, s. L. C.	Utah	10,000,000	400,000	250	110,000	.....	1882	.25	960,000	June	1891	.10
89	Martin White, s.	Nev.	10,000,000	100,000	100	1,225,000	Oct.	1890	.25	140,000	Dec.	1886	.25
90	Mary Murphy, s. G.	Colo.	350,000	3,500	101	*	.....	.....	.....	175,000	May	1888	5.00
91	Matchless, s. L.	Colo.	500,000	500,000	1	*	.....	.....	.....	15,000	Feb.	1890	.00½
92	May Mazeppa, s. L.	Colo.	1,000,000	100,000	1	.....	.....	.....	.....	168,000	July	1891	.01½
93	Minas Prietas, G. s.	Mex.	1,000,000	100,000	10	*	.....	.....	.....	950,000	Dec.	1890	.50
94	Minnesota, c.	Mich.	1,000,000	40,000	25	420,000	April	1886	1.00	1,820,000	Mar	1876	.....
95	Mollie Gibson, s.	Colo.	5,000,000	1,000,000	5	*	.....	.....	.....	400,000	July	1891	.05
96	Monitor, G.	S. Dak	2,500,000	250,000	10	.....	.....	.....	.....	45,000	Oct.	1890	.03
97	Mono, G.	Cal.	5,000,000	50,000	100	760,000	Sept.	1890	.25	12,500	Mar.	1886	.25
98	Montana, Lt., G. S.	Mont.	3,300,000	660,000	5	*	.....	.....	.....	2,619,075	June	1891	.12½
99	Morning Star, s. L.	Colo.	1,000,000	100,000	10	.....	.....	.....	.....	925,000	April	1891	.25
00	Moulton, s. G.	Mont.	2,000,000	400,000	5	*	.....	.....	.....	380,000	Dec.	1887	.07½
100	Mount Pleasant, G.	Cal.	150,000	150,000	1	*	.....	.....	.....	150,000	Feb.	1887	.30
102	Mt. Diablo, s.	Nev.	5,000,000	50,000	100	137,500	June	1880	2.00	180,000	Sept.	1890	.40
103	Napa, G.	Cal.	700,000	100,000	7	*	.....	.....	.....	420,000	July.	1891	.10
104	Navajo, G. S.	Nev.	10,000,000	100,000	100	500,000	April	1890	.15	229,995	April	1889	.10
105	New California, G.	Colo.	980,000	160,000	5	*	.....	.....	.....	48,980	May.	1890	.12½
106	New Guston, s.	Colo.	550,000	110,000	5	*	.....	.....	.....	785,000	April	1891	1.00
107	N. Hoover Hill, G. S.	N. C.	300,000	120,000	2½	*	.....	.....	.....	30,000	Dec.	1885	.06½
108	Northern Belle, s.	Nev.	5,000,000	50,000	100	425,000	Jan.	1884	8.00	2,400,000	April	1883	.50
109	North Belle Isle, s.	Nev.	10,000,000	100,000	100	395,000	April	1890	.20	230,000	May	1888	.50
110	North Star, G.	Cal.	1,000,000	100,000	10	.....	.....	.....	.....	360,000	April	1889	.50
111	Ontario, s. L.	Utah	15,000,000	150,000	100	.....	.....	.....	.....	11,275,000	June	1891	.50
112	Ophir, G. S.	Nev.	10,000,000	100,000	100	4,210,640	April	1890	.50	1,595,800	Jan.	1890	1.00
113	Original, s. C.	Mont.	1,500,000	60,000	25	*	.....	.....	.....	138,000	Jan.	1889	.05
114	Oro, s. L. G.	Colo.	500,000	100,000	5	.....	.....	.....	.....	95,000	July	1890	.20
115	Osceola, c.	Mich.	1,250,000	50,000	25	480,000	April	1876	1.60	1,547,500	July.	1891	1.00
116	Parrot, c.	Mont.	1,800,000	180,000	10	.....	.....	.....	.....	850,000	May.	1891	.10
117	Pencook, s. G. C.	N. M.	2,000,000	200,000	10	*	.....	.....	.....	60,000	Nov.	1886	.....
118	Plumas Eureka, G.	Cal.	1,406,250	140,625	10	*	.....	.....	.....	2,548,000	Oct.	1889	.37½
119	Plymouth Con., G.	Cal.	5,000,000	100,000	50	*	.....	.....	.....	2,280,000	Feb.	1888	.40
120	Quicksilver, pref., Q.	Cal.	4,300,000	43,000	100	.....	.....	.....	.....	1,770,161	Jan.	1891	1.50
121	" com., Q	Cal.	5,700,000	57,000	100	.....	.....	.....	.....	643,867	July	1882	.40
122	Quincy, c.	Mich.	1,000,000	40,000	25	200,000	Dec.	1862	.....	5,770,000	Feb.	1891	5.00
123	Reed National, s. G.	Colo.	500,000	500,000	1	*	.....	.....	.....	50,000	Dec.	1890	.01
124	Rialto, G.	Cal.	300,000	300,000	1	*	.....	.....	.....	13,500	July.	1891	.01½
125	Richmond, s. L.	Nev.	1,350,000	54,000	25	*	.....	.....	.....	4,332,887	Jan.	1891	.62½
126	Ridge, c.	Mich.	500,000	20,000	25	219,939	Mar.	1886	.50	99,785	Feb.	1880	.50
127	Robinson Con., s. L.	Colo.	10,000,000	200,000	50	*	.....	.....	.....	585,000	Mar.	1886	.05
128	Running Lode, G.	Colo.	1,000,000	1,000,000	1	*	.....	.....	.....	15,000	June	1891	.00½
129	Savage, s.	Nev.	11,200,000	112,000	100	6,604,000	Nov.	1889	.50	4,460,000	June	1889	3.00
130	Sheridan, s.	Colo.	300,000	3,000	100	*	.....	.....	.....	225,000	Dec.	1890	3.33½
131	Shoshone, G.	Idaho	150,000	150,000	1	.....	.....	.....	.....	7,500	April	1883	.01
132	Sierra Buttes, G.	Cal.	2,225,000	122,500	10	.....	.....	.....	.....	1,492,557	April	1888	.12½
133	Sierra Nevada, s. G.	Nev.	10,000,000	100,000	100	6,296,910	May	1890	.50	102,000	Jan.	1871	1.00
134	Sierra Nevada, s. L.	Idaho	1,000,000	1,000,000	1	*	.....	.....	.....	40,000	May.	1889	.02
135	Silent Friend, L.	Colo.	500,000	500,000	1	.....	.....	.....	.....	32,500	April	1891	.02½
136	Silver Cord, s. L. G.	Colo.	4,500,000	450,000	10	.....	.....	.....	.....	225,000	Nov.	1888	.25
137	Silver King, s.	Ariz.	10,000,000	100,000	100	130,000	Nov.	1890	.30	1,950,000	July.	1887	.25
138	Silver Mg. of L. V., s. L.	N. M.	500,000	500,000	1	*	.....	.....	.....	375,000	May	1891	.05
139	Small Hopes Con., s.	Colo.	5,000,000	250,000	20	*	.....	.....	.....	3,162,500	Oct.	1890	.10
140	Spring Valley, G.	Cal.	200,000	200,000	1	50,000	Oct.	1886	.25	50,000	Jan.	1881	.25
141	Standard, G. S.	Cal.	10,000,000	100,000	100	100,000	June	1890	.50	3,585,000	June	1890	.05
142	Stormont, s.	Utah	500,000	500,000	1	*	.....	.....	.....	155,000	Nov	1881	.05
143	St. Joseph, L.	Mo.	1,500,000	150,000	10	*	.....	.....	.....	1,974,000	Dec.	1890	.02
144	Tamarack, c.	Mich.	1,250,000	50,000	25	520,000	April	1885	3.00	2,090,000	Aug.	1891	4.00
45	Tombs'one, G. S. L.	Ariz.	12,500,000	500,000	25	*	.....	.....	.....	1,250,000	April	1882	.10
46	United Verde, c.	Ariz.	3,000,000	300,000	10	*	.....	.....	.....	127,500	May	1890	.10
147	Viola Lt., s. L.	Idaho	750,000	150,000	5	.....	.....	.....	.....	337,500	Nov.	1888	.37½
148	Ward Con., s.	Colo.	2,000,000	200,000	10	.....	.....	.....	.....	20,000	Dec.	1889	.05
149	Woodside, s. L.	Utah	100,000	100,000	10	.....	.....	.....	.....	25,000	Oct.	1889	.25
150	W. Y. O. D.	Cal.	30,000	15,000	2	11,250	Feb	1890	.10	4,500	May.	1891	.10
151	Yankee Girl, s.	Colo.	2,500,000	250,000	10	.....	.....	.....	.....	1,405,000	April	1891	.50
152	Yellow Jacket, G. s.	Nev.	12,000,000	120,000	100	5,508,000	Mar.	1889	.50	2,184,000	Aug.	1871	2.50
153	Young America, G.	Cal.	.....	.....	...	.....	.....	.....	.....	175,000	Jan.	1889	.10

NON-DIVIDEND PAYING MINES.

	Name and Location of Company.		Capital Stock.	Shares. No.	Shares. Par	Assessments. Total levied.	Assessments. Date and am't of last.		
1	Allegheny, s.	Colo.	$5,000,000	500,000	$10	*	.....	.....	.....
2	Alliance, s. G.	Utah	100,000	100,000	1	$120,000	Feb.	1891	.30
3	Allouez, c.	Mich.	2,000,000	80,000	25	737,000	Jan.	1890	.70
4	Alpha Con., G. s.	Nev.	3,000,000	30,000	100	112,500	Sept.	1890	.25
5	Alta, s.	Nev.	10,080,000	100,800	100	3,359,800	Sept.	1890	.50
6	American Flag, s.	Colo.	1,250,000	125,000	10	300,000	June	1887	.....
7	Amity, s.	Colo.	250,000	250,000	1	.....	.....	.....	.....
8	Anchor s. L. G.	Utah	3,000,000	150,000	20	410,000	June	1890	.20
9	Anglo-Montana, Lt.	Mont.	600,000	120,000	5	.....	.....	.....	.....
10	Astoria, G.	Cal.	200,000	100,000	2	.....	.....	.....	.....
11	Barcelona, G.	Nev.	5,000,000	200,000	25	*	.....	.....	.....
12	Bechtel Con., G.	Cal.	10,000,000	100,000	100	173,500	.....	1883	.10
13	Belmont, G.	Cal.	500,000	500,000	1	*	.....	.....	.....
14	Belmont, s.	Nev.	5,000,000	50,000	100	735,000	April	1886	.10
15	Best & Belcher, s. G.	Nev.	10,080,000	100,800	100	2,279,275	Aug.	1890	.25
16	Black Oak, G.	Cal.	3,000,000	300,000	10	*	.....	.....	.....
17	Boston Con., G.	Cal.	10,000,000	100,000	100	170,000	Nov.	1883	.25
18	Bremen, s.	N. M.	5,000,000	500,000	10	*	.....	.....	.....
19	Brownell, G.	Colo.	250,000	250,000	1	*	.....	.....	.....
20	Brunswick, G.	Cal.	2,000,000	400,000	5	*	.....	.....	.....
21	Buckeye, s. L.	Mont.	1,000,900	500,000	2	.....	.....	.....	.....
22	Bullion, s. G.	Nev.	10,000,000	100,000	100	2,790,000	Dec.	1889	.25
23	Butte & Boston, c. s.	Mont.	5,000,000	200,000	...	.....	.....	.....	.25
24	Calaveras, G.	Cal.	500,000	500,000	1	*	.....	.....	.....
25	Carisa, G.	Wy.	500,000	100,000	5	*	.....	.....	.....
26	Carupano, G. S. L. C.	Ven.	200,000	100,000	2	*	.....	.....	.....
27	Cashier, G. s.	Colo.	500,000	250,000	2	*	.....	.....	.....
28	Cherokee, G.	Cal.	1,500,000	150,000	10	.....	.....	.....	.....
29	Chollar, s. G.	Nev.	11,200,000	112,000	100	1,540,000	Nov.	1889	.50
30	Cleveland, T.	Dak.	1,000,000	500,000	2	*	.....	.....	.....
31	Colchis, s. G.	N. M.	500,000	50,000	10	.....	.....	.....	.....
32	Colorado Silver	Colo.	1,625,000	325,000	5	.....	.....	.....	.....
33	Comstock Tun.	Nev.	10,000,000	100,000	100	35,000	Mar.	1887	.15
34	Con. Imperial, G. s.	Nev.	5,000,000	50,000	100	1,875,000	July.	1890	.05
35	Con. New York, s. G.	Nev.	5,000,000	100,000	50	70,000	Nov.	1890	.15
36	Con. Pacific, G.	Cal.	6,000,000	60,000	100	198,000	June	1890	.10
37	Con. Silver, s.	Mo.	2,500,000	250,000	10	.....	.....	.....	.....
38	Crescent, s. L.	Colo.	3,000,000	300,000	10	.....	.....	.....	.....
39	Crocker, s.	Ariz.	10,000,000	100,000	100	150,000	June	1890	.15
40	Crowell, G.	N. C.	500,000	500,000	1	*	.....	.....	.....
41	Dahlonega, G.	Ga.	250,000	250,000	10	*	.....	.....	.....
42	Dandy, s.	Colo.	5,000,000	500,000	10	*	.....	.....	.....
43	Decatur, s.	Colo.	1,500,000	300,000	5	*	.....	.....	.....
44	Denver City, s.	Colo.	5,000,000	500,000	10	*	.....	.....	.....
45	Denver Gold, G.	Colo.	300,000	60,000	5	*	.....	.....	.....
46	Dickens-Custer, s.	Idaho	2,100,000	420,000	5	*	.....	.....	.....
47	Durango, G.	Colo.	500,000	500,000	1	*	.....	.....	.....
48	Eastern Dev. Co., Lt.	N. S.	1,500,000	150,000	10	990,000	Mar	1886	1.00
49	El Cristo, G. s.	U.S.C.	1,000,000	500,000	2	*	.....	.....	.....
50	El Dorado, G.	Cal.	1,000,000	250,000	4	*	.....	.....	.....
51	El Talento, G.	U.S.C.	1,000,000	500,000	2	.....	.....	.....	.....
52	Emmons, s. L.	Colo.	2,000,000	2,000,000	1	.....	.....	.....	.....
53	Empire, s.	Utah	10,000,000	100,000	100	.....	.....	.....	.....
54	Eureka Tunnel, s. L.	Nev.	10,000,000	100,000	100	*	.....	.....	.....
55	Exchequer, s. G.	Nev.	10,000,000	100,000	100	865,000	July.	1890	.25
56	Found Treasure, G. s.	Nev.	10,000,000	100,000	100	81,500	May.	1890	.25
57	Gogebic I. Syn., I.	Wis	5,600,000	200,000	25	.....	.....	.....	.....
58	Gold Cup, s.	Colo.	500,000	500,000	1	*	.....	.....	.....
59	Golden Era, s.	Mont.	2,000,000	200,000	10	*	.....	.....	.....
60	Gold Rock, G.	Cal.	1,000,000	500,000	2	*	.....	.....	.....
61	Goodshaw, G.	Cal.	10,000,000	100,000	100	*	.....	.....	.....
62	Grand Belt, G.	Tex.	12,000,000	120,000	100	*	.....	.....	.....
63	Grand Duke.	Colo.	800,000	80,000	10	.....	.....	.....	.....
64	Great Remance, G.	U.S.C.	1,000,000	500,000	2	*	.....	.....	.....
65	Gregory Con., G.	Mont.	3,000,000	300,000	10	*	.....	.....	.....
66	Harlem M. & M. Co., G.	Cal.	1,000,000	200,000	5	.....	.....	.....	.....
67	Hartery Con., G.	Cal.	1,000,000	100,000	10	22,000	Oct.	1890	.05
68	Head Cent. & Tr., s. G.	Ariz.	10,000,000	100,000	100	.....	.....	.....	.....
69	Hector, G.	Cal.	1,500,000	300,000	5	45,000	Jan.	1889	.15
70	Highland, c.	Mich.	500,000	25,000	20	.....	.....	.....	.....
71	Holywood.	Cal.	200,000	100,000	2	.....	.....	.....	.....
72	Hortense, s.	Colo.	2,000,000	200,000	10	.....	.....	.....	.....
73	Huron, c.	Mich.	1,000,000	40,000	25	280,000	May	1887	3.00
74	Iron, Gold & Silver, s.	N. M.	2,000,000	200,000	10	*	.....	.....	.....
75	Ironton, I.	Wis.	1,000,000	40,000	25	.....	.....	.....	.....
76	Iroquois, c.	Mich.	1,250,000	50,000	25	.....	.....	.....	.....
77	J. D. Reymert, s.	Ariz.

NEW YORK MINING STOCKS QUOTATIONS.

DIVIDEND-PAYING MINES.

NAME AND LOCATION OF COMPANY.	July 11.		July 13.		July 14.		July 15.		July 16.		July 17.		SALES.
	H.	L.	H.	L.	H.	L.	H.	L.	H.	L.	H.	L.	
Adams, Colo.													
Alice, Mont.					1.60		1.70	1.60	1.65				500
Aspen, Nev.													
Atlantic, Mich.													
Bassick													
Belle Isle, Nev.													
Bodie Cons., Cal.													
Bos. & Mont., Mont													
Breece, Colo.													
Bulwer, Cal.													
Caledonia, S. Dak.													
Catalpa													
Chrysolite, Colo.													
Colorado Central, Colo.													
Commonwealth, Nev.													
Comstock T. bonds, Nev.													
" scrip., Nev.													
Cons. Cal. & Va., Nev.			6.75	6.00			6.00		6.00		5.88		610
Crown Point, Nev.	1.25				1.25				1.15		1.00		400
Deadwood, Dak.					1.35	1.20							300
Eureka Cons., Nev.													
Father de Smet, S. Dak.									.20				11
Franklin, Mich.													
Freeland, Colo.													
Gould & Curry, Nev.			1.45		1.45						1.25		500
Granite Mountain, Mont.													
Hale & Norcross, Nev.									1.75				100
Homestake, Dak.					11.00								5
Horn-Silver, Utah.					3.33				3.50	3.40			600
Independence, Nev.													
Iron Hill, Dak.													
Kearsarge, Mich.													
Leadville Cons., Colo.			.10										1,000
Little Chief, Colo.			.30										300
Martin White, Nev.													
Mono, Cal.													
Mt. Diablo, Nev.													
Navajo, Nev.											.31	.31	2,350
N. Belle Isle, Nev.													
Ontario, Utah.			40.00				39.50		39.50				210
Ophir, Nev.	3.10		3.00		3.00		3.00		2.95		2.95		600
Osceola, Mich.													
Plymouth, Cal.													
Quicksilver, Pref., Cal.													
" Com., Cal.													
Quincy, Mich.													
Robinson Cons., Colo.													
Savage, Nev.	1.75								1.40				250
Sierra Nevada, Nev.	2.20		2.30								2.15		210
Silver Cord, Colo.													
Silver King, Ariz.													
Silver Mg. of L. V., N. M.													
Small Hopes, Colo.													
Standard.													
Yellow Jacket, Nev.	1.85		1.85		1.75						1.60		400

NON-DIVIDEND-PAYING MINES.

NAME AND LOCATION OF COMPANY.	July 11.		July 13.		July 14.		July 15.		July 16.		July 17.		SALES
	H.	L.	H.	L.	H.	L.	H.	L.	H.	L.	H.	L.	
Alpha, Nev.													
Alta.	.85		.85		.80		.85		.75		.70		1,200
American Flag, Colo.													
Andes, Cal.													
Astoria, Cal.	.01		.01		.01		.01		.01		.01		8,200
Augusta, Ga.													
" bonds.													
Barcelona, Nev													
Belmont, Cal.	.75		.75		.76	.75	.75		.76		.77	.76	2,500
Best & Belcher, Nev.	2.40				2.25		2.20		2.10		1.90		600
Bonanza King, Cal.													
Brunswick, Cal.	.09		.09				.09						2,300
Bullion, Nev.													
Butte & Bost., Mont.													
Castle Creek, Idaho.													
Challar.			2.00				1.75		1.75		1.60		500
Comstock T., Nev.			.16		.16	.15			.18	.17			4,500
Con. Imperial, Nev.													
Cons. Pacific, Cal.													
Crescent, Colo.													
Del Monte, Nev.													
El Cristo, Rep. of Col.					.80								100
Emmett	.65		.70	.65									400
Exchequer, Nev.													
Hollywood, Cal.													
Huron, Mich.													
Justice, Nev.													
King & Pembroke, Ont.													
Lacrosse, Colo.													
Lee Basin, Colo.													
Mexican, Nev.	2.25				2.00		1.95				1.80		400
Middle Bar, Cal.													
Monitor, Colo.													
Mutual S. & M. Co., Wash.													
Nevada Queen, Nev.					.80								200
N. Standard, Cal.													
N. Commonwealth, Nev.													
Occidental, Nev.													
Oriental & Mil., Nev.													
Phœnix of Ariz.													
Phœnix Lead, Colo.													
Potosi, Colo.	4.40		4.10				3.90		3.75				400
Rappahannock, Va.													
S. Sebastian, S. Sal.													
Santa Fe, N. M.													
Scorpion, Nev.											.30		1,200
Seg Belcher, Nev.													
Shoshone, Idaho.													
Silver Hill, Nev.													
Sullivan Con., Dak.													
Sutro Tunnel, Nev.													
Syndicate.													
Tornado Con., Nev.													
Union Cons., Nev.	2.10		2.05								1.90		500
Utah, Nev.	.75		.75		.75		.75				.65		1,000

*Ex dividend. †Dealt at in the New York Stock Ex. Unlisted securities. ‡Assessment paid. §Assessment unpaid. Dividend shares sold, 6,206. Non-dividend shares sold 24,000. Total New York, 30,206.

BOSTON MINING STOCK QUOTATIONS.

NAME OF COMPANY.	July 10.		July 11.		July 13.		July 14.		July 15.		July 16.		SALES.
Atlantic, Mich					16.75	16.50			16.50	16.00			167
Bodie, Cal.													
Bonanza Development													
Bost. & Mont., Mont.	45.35	45.00					45.50		45.75	45.13	45.75		405
Breece, Colo.													
Calumet & Hecla, Mich.							255		255		259		10
Catalpa, Colo.													
Central, Mich.													
Cœur d'Alene, Id.			1.25										100
Con. Cal. & Va., Nev.													
Dunkin, Colo.													
Eureka, Nev.													
Franklin, Mich.			16.50				16.50				16.50		15
Honorine, Utah.													
Horn Silver, Utah.													
Kearsarge, Mich.									12.00				15
Little Chief, Colo.													
Little Pittsburg, Colo.													
Minnesota Iron.													
Napa, Cal.											4.00		100
Ontario, Utah.													
Osceola, Mich.			38.00				37.50		37.50	37.25			68
Quincy, Mich.											110		3
Ridge, Mich.													
Sierra Nevada, Nev.													
Silver King, Ariz.													
Stormont, Utah.													
Tamarack, Mich.	152				152				156	150			133
Tecumseh, Mich.													

NAME OF COMPANY.	July 10.		July 11.		July 13.		July 14.		July 15.		July 16.		SALES
Allouez, Mich.	2.75		2.63	2.50					2.25				1,230
Arnold, Mich.													
Aztec, Mich.													
Brunswick, Cal.													
Butte & Boston, Mont.			16.00	15.50	15.75	15.50	15.50	15.38	15.50		15.75	15.50	890
Centennial, Mich.	15.75										15.00		200
Comstock, T., Nev.													
Copper Falls, Mich.													
Crescent, Colo.													
Dana, Mich.													
Don Enrique, N. M.													
El Cristo, S. A.													
Hanover, Mich.													
Humboldt, Mich.													
Hungarian, Mich.													
Huron, Mich.	1.50								1.56	1.50	1.50		560
Mesnard, Mich.													
National, Mich.													
Native, Mich.													
Oriental & M., Nev.													
Phœnix, Ariz.													
Pontiac, Mich.													
Rappahannock, Va.													
Santa Fe, N. Mex.					.45				.45				625
Shoshone, Idaho.													
South Side, Mich.													
Star, Mich													
Washington, Mich.													
Winthrop, Mich.													

Boston: Dividend shares sold, 1,016. Non-dividend shares sold, 3,505. Total Boston, 4,521.

COAL STOCKS.

NAME OF COMPANY.	July 11.		July 13.		July 14.		July 15.		July 16.		July 17.		Sales.
	H.	L.	H.	L.	H.	L.	H.	L.	H.	L.	H.	L.	
American Coal.													
Cambria Iron.													
Cameron Coal & I. Co.													
Ches. & O. R. R.													
Chic. & Ind. Coal R. R.													
Do. pref.													
Col. C. & I.			34½		33		33½	32½					915
Col. C. & Hocking C. I.			15	14¼	14¼	14							700
Consolidation Coal.					28								20
Del. & H. C.	129¾	129¾	128¼		129¾	129	128¼	128¼	128¼		128¼	128	735
†D., L. & W. R. R.	135½		135	134½	135	134½	134½	134¾	134¾	134¾	134½	134	5,720
Hocking Valley.	25								25				200
Hunt & Broad Top.	24		24¼		24		24	23¾					395
Do. pref.	48¾	48¾	48½	48¾	48¾		48	47¾	48				260
Illinois C. & Coke Co.													
†Lehigh C. & N.			46¾	46¾	46¾	46¾	46¾	46¾	46¾	46¾			1,345
†Lehigh Valley R. R.	47⅛		47⅛		47⅛		47⅛	47⅛	47⅛	47⅛			454
Lehigh & Wilk. Coal.													
Mahoning Coal.													
Do. pref.													
Maryland Coal.					18¼						18⅝		110
Morris & Essex.	140				141	140							144
†New Central Coal.											9¼		100
N. J. C. R. R.			114	113¾	114		113¾	111¾	111¾	111¼	112		1,651
N. Y. & S. Coal.													
N. Y., Susq. & West.									6⅞				10
Do. pref.													
N. Y. & Perry C. & I.													
†Norfolk & West. R. R.													
†Do. pref.			51		50¾		50¾	50			48¾	48¼	750
†Penn. Coal.													
†Penn. R. R.	50⅜	50⅛	50⅜	50⅜	50⅜	50⅜	50⅛	50⅜	50⅛	50⅛			2,667
Ph. & R. R. R.	29¼		29⅜	29	29	28⅝			29	28½	28⅝	28¼	*7,145
Sunday Creek Coal.													
Do. Pref.													
Tennessee C. & I. Co.	32½		32¾	32½	32½	32¼					32¼	32	1,000
Do. pref.													
Westmoreland Coal.													

* Shares sold in New York, 3,235; in Philadelphia, 3,910. Total sales, 24,321.
† Par value, $50.

Deadwood.

JULY 6.

The following are the closing quotations:

Anna	.03½	
Bullion	.03	
Carthage	.01¼	.01⅜
Cora	.04	.05
Double Standard	.12	.13
Emmett	.01⅜	.02
Equitable	.01	
Florence	.03	.04
Golden Reward	.33	.35
Harmony	.07	.08½
Hermit	.02	.03
Hesta A	.03	.03½
Isidora	.40	
Iron Hill	.14	.19
New Era	.02	.02½
Maggie	.07	.10
Mikado	.04	.05
Mutual	.01	.01¼
Rainbow	.02½	.03
Retriever	.20	.21
Ross Hannibel	.07	.09
Ruby Wilkes	.01	
Seab'ry-Calkins	.04	
Seeward	.09	
Tornado	.12	.14
Troy	.01	.01½
Uncle Sam	.09	.10½

Aspen.

Highest and lowest prices for the week ending July 13th:

Argentum Juniata	$1.50	$1.53
Best Friend	.21	.24
Bushwacker	.30	.34
Della S.	4.00	4.50
Little Annie	.21	.23
Mollie Gibson	4.00	4.10
Nolan Creek	....	.10
Park, Mamie & Queen	....	....
Pontiac	.11	.13
St. Joe & Mineral F'rm	.32	.36

San Francisco Mining Stock Quotations.

NAMES OF STOCKS.	CLOSING QUOTATIONS. July 10.	July 11.	July 13.	July 14.	July 15.	July 16.
Alpha	.75	.75	.70	.75	.65	.60
Alta						
Belcher	.65	.60	.45	.50	.55	.50
Belle Isle	2.25	2.15	2.05	2.05	1.90	1.70
Best & Bel.	.85	.85	.80	.86	.50	.35
Bodie	.50		.45	.40	.25	.30
Bulwer	1.00	1.85	1.75	1.65	1.60	1.40
Challar	.60	.60	.60	.60		.45
Com wealth	6.50	6.00	5.87½	6.00	5.50	5.25
Con. C. & V.						
Con Pacific	1.10	1.10	1.05	1.05	1.05	.90
Crown Point						
Del M'te. Nev.	3.25	3.00				
Eureka C.	1.30	1.30	1.30	1.25	1.25	1.10
Gould & C.	1.75	1.75	1.55	1.65	1.60	1.55
Hale & N.						
M. White	2.10	2.15	1.85	1.80	1.75	1.05
Mexican	.50	.50	.50	.50	.50	
Mono						
Mt. Diablo	.25	.25	.20	.30	.25	
Navajo	.10	.20	.15		.25	.15
Nev. Queen			.60	.45		
N. Belle Isle		.50				
N. Com'w'lth	3.95	2.90	2.90	2.85	2.70	2.75
Ophir	4.25	3.90	3.90	3.75	3.50	2.85
Potosi	1.55	1.50	1.35	1.35	1.35	1.10
Savage	2.05	2.10	2.10	2.10	2.05	2.05
Sierra Nev.	1.90	1.90	1.75	1.85	1.75	1.75
Union Con.	.65	.60	.60	.65	.60	.55
Utah	1.60	1.65	1.60	1.55	1.50	1.40
Yellow Jack.						

STOCK MARKET QUOTATIONS.

Baltimore, Md.

COMPANY.	Bid. L.	Asked. H.
Atlantic Coal	$1.00	$1.25
Balt. & N. C.	....	.10
Big Vein Coal	....	....
Conrad Hill	....	.10
Cons. Coal	.24	.28@.30
Diamond Tunnel	.20	.35
George's Crk. C.	1.10	1.12@1.15
Lake Chrome	.10	.15
Maryland & Charlotte	....	....
North State	....	....
Silver Valley	.55	.70

Prices bid and asked, lowest and highest, during the week ending July 16.

Birmingham, Ala. July 16.

COMPANY.	Bid. L. H.	Asked. L. H.
Ala. Coal & I. Co.	....	$100
Ala. Conn. C. & C. Co.	....	$23
Ala. R. Mill Co.	$100	....
*Alice Furnace	$100	....
Anna Howe G. Mg. Co.	$¼	$½
Bessemer Land	$29	$30
Bir. Mg. & Mfg.	....	$35
Cahaba Coal Mg. Co.	....	$61
Camille Gold Mg. Co.	$½	$¾
De Bardeleben C. & I. Co.	$8½	$9½
Decat. L. Imp.	$8¾	$9½
Decatur Min. L.	....	$19
Ensley Land	$7½	$9
*Eureka	....	....
Florence L. & Mg. Co.	....	$18¼
Gadsen Land	$3½	$3¾
Hecla Coal Co.	....	....
Hen. S. & M. Co.	$2¾	$4¼
Jagger-Townl'y C. & C. Co.	$8¼	$10
Mag-Ellen	$100	....
Mary Lee C. & R. Co.	....	$25
Sheffield C. & I. Co.	$52½	$55
Sloss I. & S	$18¼	$21
†Sloss I. & S	$85	$87
‡‡ Sloss I. & S.	$49	$52½
Tuscaloose C. I. & L. Co.	....	$24
Ten. C. & I. Co.	$32¼	$35
" pref.	$86	$88
Vulcan C. & C. Co	$5	$7½
Woodstock I. Co.	$28	$29

* Bonds. † First mortgage. ‡‡ Second mortgage. ** Without interest.

Pittsburg, Pa. July 16.

COMPANY.	B.	A.
Allegheny Gas Co.	$43.00	$.....
Bridgewater Gas Co.	....	....
Chartiers Val. Gas	8.75	9.38
Columbia Oil Co.	2.00	....
Consignee Mg. Co	.20	.50
Consolidated Gas Co.	43.00	....
East End E. Light Co.	....	....
East End Gas Co	....	....
Forest Oil	....	....
Hazlewood Oil Co.	....	....
Hidalgo Mining	4.25	5.00
La Noria Mining	.30	.40
Luster Mg. Co.	12.75	13.13
Mansfield C. & C. Co.	....	....
Manuf'turers Gas Co.	24.00	25.00
Nat. Gas Co. of W. Va	57 50	60.00
N. Y. & Clev. Gas Coal	....	40.00
Ohio Valley Gas	20.00	....
Pennsylvania Gas	....	11.00
People's Natural Gas	....	30.00
People's N. G. & P. Co.	9.00	10.00
Philadelphia Co	13.38	13.50
Pine Run Gas Co	....	....
Pittsburg Gas	72.00	....
Silverton Mg. Co.	1.75	2.00
Sterling Silver Mg. Co.	4.00	5.00
South Side Gas	....	....
Tuna Oil Co.	....	55.00
Union Gas	....	....
Washington Oil Co.	....	91.50
W'house Brake Co	....	....
W house A. B. Co	94.75	95.50
W'nouse E. Light	12.88	13.25
W'moreland & Camb	....	....
Wheeling Gas	....	22.00

St. Louis. July 15.

CLOSING PRICES.

COMPANY.	Bid.	Asked.
Adams, Colo	$1.90	$ .....
American & Nettie	.27½	.28¾
Aztec, N. Mex.	....	.10
Bi-Metallic	34.00	36.00
Central Silver	....	.02
Cleveland, Colo.	....	....
Elizabeth	1.75	1.90
Four Mile	....	.25
Gold King	....	....
Granite Mountain, Mont.	20.75	21.50
Hope	....	....
Ingram	....	....
L. X. L. Colo.	....	....
La Union	....	....
Little Albert	.01	.02½
Major Budd, Mont.	....	....
Mexican Imp	....	.09
Mickey Breen	.40	.55
Montrose Placer, Colo.	.60	.65
Mountain Key	.45	.50
Nellie	.04	....
Old Colony	....	....
Pat Murphy, Colo.	.05	.05½
Puzzle	....	....
Richmond Hill	....	....
Samoa	....	....
Silver Age, Colo.	1.00	1.15
Small Hopes, Colo.	.77½	.85
St. Louis & Aspen	....	4.00
Tourtelotte	....	....
West Granite, Mont.	....	....
Wire Patch	....	....
Yuma, Ariz.	.70	.72½

Trust Receipts.

Sales at the New York Stock Exchange week ending July 17:

	Sales.	Price H.	Price L.
American Cotton Oil	....	....	....
National Lead	5,017	18⅜	17⅝

* Trust receipts.

Trust Stocks. July 17.

The following closing quotations are reported to-day by C. I. Hudson & Co., members of New York Stock Exchange:

CERTIFICATES.

Am. Cotton Oil, Com	$21½@	$22½
" " " Pfd	40 @	43
Am. Sugar Refineries, Com	82 @	84
" " " Pfd	88 @	90
Distillers' & Cattle Feeders'	46¼@	46½
Linseed Oil	....@	30
Standard Oil	161 @	162
National Lead	17⅜@	17⅝
W. U. Beef Co.	10 @	13

Foreign Quotations.

London. July 8.

COMPANY.	Highest.	Lowest.
Almada, Mex.	2s. 3d.	1s. 9d.
Amador, Cal.	3s.	2s. 6d.
American Belle, Colo.	16s.	15s.
Appalachian, N. C.	2d.	1d.
Canadian Phos., Can.	10s.	5s.
Colorado, Colo.	2s. 3d.	1s. 9d.
Comstock, Utah	....	.. ..
Cordova	....	.. ..
Cons. Esmeralda, Nev.	1s. 6d.	1s. 3d.
De Lamar, Idaho	£1½	£1 3-16
Denver Gold, Colo.	6d.	6d.
Dickens Custer, Idaho.	2s. 2d.	1s. 11d.
East Arevalo, Idaho.	1s. 3d.	9d.
El Callao, Venezuela	£¾	£¾
Elkhorn, Mont.	£1½	£1⅝
Elmore, Idaho	1s. 8d.	1s. 5d.
Emma, Utah	2s. 2d.	1s. 10d.
Empire, Mont.	1s. 3d.	9d.
Flagstaff, Utah	5s. 9d.	5s. 3d.
Garfield, Nev	9d.	3d.
Golden Leaf, Mont	2s.	1s. 11d.
Jay Hawk, Mont.	9d.	3d.
Josephine, Cal.	1s.	6d.
Kohinoor, Colo.	1s. 3d.	9d.
La Luz, Mex.	1s. 9d.	1s. 6d.
La Valera, Mex.	15s.	10s.
Mammoth Gold, Ariz.	3s. 3d.	2s. 9d.
Montana, Mont.	9s. 6d.	8s. 6d.
New California, Colo.	4s. 6d.	4s.
New Consolidated	9d.	3d.
New Eberhardt, Nev.	1s. 3d.	9d.
Newfoundland, N. F.	3s. 6d.	3s.
N. Gold Hill, N. C.	1s. 3d.	1s.
New Guston, Colo.	£4	£3½
New Hoover Hill, N.C.	9d.	3d.
New La Platte, Colo.	1s.	6d.
New Russell, N. C.	9d.	6d.
New Viola, Idaho	9d.	3d.
Old Lout, Colo	....	6d.
Palmarejo, Mex.	13s.	13s.
Parker, Gold N. C.	9d.	3d.
Pinos Altos, Mex.	5s. 6d.	5s.
Pittsburg Cons., Nev.	4s. 6d.	3s. 6d.
Richmond Con., Nev.	£⅞	£⅝
Ruby, Nev	6d.	3d.
Sam Christian, N C.	9d.	3d.
Sierra Buttes, Cal.	5s.	4s.
" Plumas E.r., Cal.	£⅝	£½
United Mexican, Mex.	6s.	5s.
U. S. Placer, Colo.	6d.	6d.
West Argentine, Colo.	1s. 6d.	1s.
Yankee Girl, Colo.	£1 8s. 6d.	£1 7s. 6d.

Paris. July 3.

	Francs.
Belmez, Spain	800.00
Callao, Venez	10.50
Callao Bis., Venez	15.00
East Oregon, Ore.	4.00
Forest Hill Divide, Cal.	85.00
Golden River, Cal.	130.00
" " parts	30.00
Lexington, Mont	95.00
" parts	2.50
Rio Tinto, Spain	583.12
Tharsis, Spain	163.75

CURRENT PRICES.

Those quotations are for wholesale lots in New York.

CHEMICALS AND MINERALS.

Acid—Acetic, No. 8, pure, 1,040, ℔ lb..04½
Commercial, in bbls. and cbys.01¾@.02¼
Carbonic, liquefied .40
Chromic, ch. pure .$1.00
for batteries .50
Hydrobromic, dilute, U. S. P. .35
Hydrocyanic, U. S. P. .55
Hydrofluoric .30
Alcohol—95%, ℔ gall. 2.40
Absolute 4.00
Ammoniated 3.00
Alum—Lump, ℔ lb. 1¾
Ground, ℔ lb. 1⅞
Powdered 4@5
Lump ℔ ton, Liverpool £4 17 6
Sulphate of Alumina, ℔ lb. 1½@2⅜
Alumina Chloride—Pure, ℔ lb. 1.25
Amalgamating solution, ℔ lb. .60
Ammonia—Sul., in bbls., ℔ lb. 3-16
Carb, ℔ lb. .14
Muriate, white, in bbls., ℔ lb. .08½
Ammoniates—Fish guano, dried .$21
wet 8 50@ 9 50
Acid phosphate, 14% per cent. 72½@ 80
Aqua Ammonia—(in cbys) 18° ℔ lb. .03¾
20°, ℔ lb. .04¾
26°, ℔ lb. .06¾
Antimony—Oxymur, ℔ lb. 4¾
Argols—Red, powdered, ℔ lb. .15
Arsenic—White, powdered ℔ lb. 3@3¼
Red ℔ lb. 5@5½
White at Plymouth, ℔ ton £12 2 6
Asbestos—Am., ℔ ton $50@$300
Italian, ℔ ton, c. i. f. L'pool £18@£60
Ashes—Pot, 1st sorts, ℔ lb. 4¾@4⅞
Pearl 6¼@6½
Asphaltum—P. ton 13.00
Prime Cuban, ℔ lb. 4½@5½c.
Hard Cuban, P ton $28.00
Trinidad, refined, ℔ ton $30.00
Egyptian 8@9
Baryta—Carbonate, pure, ℔ lb. .45
Carbonate, commercial, ℔ lb .10
Chlorate, crystal, ℔ lb. .75
Chloride, commercial, ℔ lb. .10
pure, ℔ lb. .16
Iodide, ℔ oz. .40
Nitrate, powdered, ℔ lb. .15
Sulph., Am. prime white .17@20
Sulph., foreign, floated, ℔ ton .19½@21.50
Sulph., off color, ℔ ton 11.50@14.00
Carb., lump, f. o. b. L'pool, ton £6
No. 1, Casks, Runcorn, " " £4 10 0
No. 2, bags, Runcorn, " " 3 15 0
Beeswax—Refined, ℔ lb. .32
Benzole—℔ gall. 1.50
Bichromate of Potash—Scotch .10@12
American .10@12
Bichromate of Soda .8½@11½
Borax—Refined, ℔ lb. 11
Concentrated 8¼@8½
Refined " Liverpool ℔ ton £29
Bromine—℔ lb. .55
Cadmium Bromide—℔ lb. 2.00
Iodide, ℔ lb. 5.50
Chalk—℔ ton 1.75
Precipitated, ℔ lb. 4½@5
China Clay—English, ℔ ton .13½@21.00
Southern, ℔ ton 13.50
Chlorine Water—℔ lb. .10
Chrome Yellow—℔ lb. 10@25
Chromalum—Pure, ℔ lb. .40
Commercial, ℔ lb. 1.12
Cobalt—Oxide, ℔ lb. 2.50@2.90
Copper—Sulph. English Wks. ton £20@£21
Vitriol (blue), ordinary .03
" " extra .3¾
Nitrate, ℔ lb. .10
Copperas—Common, ℔ 100 lbs. .70
Best, ℔ 100 lbs. 75@1.00
Liverpool, ℔ ton, in casks £1 15s.
Corundum—Powdered, ℔ lb. 4½@.9
Flour, ℔ lb .3
Cream of Tartar—Am. 99% 24½
Powdered, 99 p. c. 25
Cryolite—Powdered, ℔ lb. .12
Kmery—Grain, ℔ lb. (℔ kg.) 4½@5
Flour, ℔ lb. 2¼@10
Epsom salt—℔ lb. 1½
Feldspar—Ground, ℔ ton 20.00
Fluorspar—Powdered, No. 1, ℔ ton. 30 00
Fuller's Earth—Lump, ℔ bbl. 90@95
Powdered, ℔ lb. 1⅞@2
Fusel Oil—℔ gall. .60
Purified, ℔ gall. .75
Gelatine—Cox's, doz 2.00
Coignet's Gold Label, ℔ lb. 1.00
Silver Label, ℔ lb. .88
Heinrich's Gold Label, ℔ lb. .75
for emulsion, ℔ lb. 1.00
Nelson's No. 1, ℔ lb. 1.10
No. 1, Shreds, ℔ lb. 1 25
No. 3, ℔ lb. .75
Glauber's Salt—in bbls., ℔ lb. .2¼
Glass—Ground, ℔ lb. .10
Glue—Brown, ℔ lb. .20
White, ℔ lb. .30
Glycerine—Concent. ch. pure, ℔ lb. .25
Gold—Chloride, pure, crystals, ℔ oz. 12.00
pure, 15 gr., c. v., ℔ doz. 5 40
liquid, 15 gr., g. s. v., ℔ doz. 5.50
Chloride and sodium, ℔ oz 6.00
15 gr., c. v., ℔ doz. 2.88
Oxide, ℔ oz. 27 25
Gypsum—Calcined, ℔ bbl. 1.25@1.50
Iodine—Resublimed 2.75
Iron—Nitrate, 40°, ℔ lb. 1½
47°, ℔ lb. 2½
Kaolin—*See China Clay.*
Lead—Red, ℔ lb. 6¾@7¼
White, American, in oil, ℔ lb. 6½@7¼
White, English, ℔ lb. 8¾@9
Acetate, or sugar of, white 12@13
Nitrate 9@10
Lime Acetate—Amer. Brown 1 10@1.20
" Gray 2.00@2.15
Litharge—Powdered, ℔ lb. 6½@7¼
English flake, ℔ lb. 9@9½
Magnesite—Greek, ℔ ton 20.00
Manganese—Crude, per unit 23@28
Oxide, ground, per lb. 2½@6½
Marble Dust—℔ bbl 1.25
Mercuric Chloride—(*Corrosive Sublimate*) ℔ lb. .89
Powdered, ℔ lb. .90
Metallic Paint—Brown per ton. $20@25
Red $20@25
Mineral Wool—Ordinary slag 1½
Ordinary rock 2½
Mica—In sheets, according to size.
1st quality, ℔ lb. 25@$6.00
Naphtha—Black 60
Nitre Cake—℔ ton 8.00
Ochre—Rochelle 1.35@1.50
Washed Nat Oxford, Lump 6½@6¾
Washed Nat Oxford, Powder 7@7½
Golden 3¾@4
Domestic ¾@1½
Oils, Mineral
Cylinder, light filtered 15@20
Dark filtered 11@15
Extra cold test 18@20
Dark steam refined 10@18
Phosphorus—℔ lb. 55@60
Precip., red .88
white .93
Plumbago—Ceylon, ℔ lb. 4@5
American, ℔ lb. 5@7
Potash—Kieserite $9@$10
Potassium—Cyanide, ℔ lb., C. P. .72
Special .50
Fused .45
Bromide, ℔ lb. .33
Chlorate, English, ℔ lb. 11@14
Chlorate, powdered 13@14
Carb, ℔ lb. 544.70@5
Caustic, ℔ lb. 7½@8
Iodide 2,65@2.70
Nitrate, refined, ℔ lb. 6@8
Bichromate, ℔ lb. 10½@11
Yellow Prussiate 32½@35
Red Prussiate 42@45
Pumice Stone—Select lumps, lb. 3¼
Original cks., ℔ lb. 1¾@2
Powdered, pure, ℔ lb. 2 @2¾
Pyrites—Non-cupreous, p. units, 11c. 12
Quartz—Ground, ℔ ton 14.00@16.00
Rotten Stone—Powdered, ℔ lb. 3½
Lump, ℔ lb. 5½@15
Original cks. 4½@5½
Rubbing stone 7
Sal Ammoniac—in bbls., ℔ lb. 10½
Salt—Liverpool, ground, ℔ sack 75@80
Turk's Island, ℔ bush 25@28
Salt Cake—℔ ton 8 00
Saltpeter—Crude, ℔ lb. 3¾@4¾
Refined, ℔ lb. 6@8
Soda—Prussiate 17½@18
Phosphate .7@18
Stannate 8@15
Strontium—Nitrate, ℔ lb. 9½@10
Sulphur—Roll, ℔ lb. .021
Flour, ℔ lb. .02
Sylvnit, 23@27%, S.O.P., per unit. 40@42½
Talc—Ground French, ℔ lb. 1¼@1½
Domestic, ℔ ton $18@$20
c. i. f. Liverpool, ℔ ton £4 5
Terra Alba—French 90@1.00
English 75@80
American, No. 1 —@—
American, No. 2 40@50
Tin—Crystals, in kegs or bbls. 16½
feathered or flossed. 25
Muriate, single 7
Double or strong, 54° B. 9
Oxy. or nitro 10
Bar 25
Vermillion—Imp. English .90 @ .95
Am. quicksilver, bulk .67 @—
Am. quicksilver, bags .68 @ .71
Chinese .95 @1 00
Trieste .90 @ .95
American 11½@ .12
Artificial 8 @ .35
Zinc—Am., Dry, ℔ lb. 4½
Antwerp, Red Seal, ℔ lb. 7½
Paris, Red Seal, ℔ lb 8½
Muriate solution 4
Sulphate crystals, in bbls., ℔ lb. 3

* Spot.

THE RARER METALS.

Aluminum—Pure, per lb. $ .90
Arsenic—(Metallic), per lb. .40
Barium—(Metallic), per gram. 4.00
Bismuth—(Metallic), per lb. 2.75
Cadmium—(Metallic), per lb. 1.00
Calcium—(Metalhc), per gram. 10.00
Cerium—(Metallic), per gram. 7.50
Chromium—(Metallic), per gram. 1 00
Cobalt—(Metallic), per lb. 6.00
Didymium—(Metallic), per gram. 9.00
Erbium—(Metallic), per gram. 7.50
Gallium—(Metallic), per gram. 140.00
Glucinum—(Metallic., per gram. 12.00
Indium—(Metallic), per gram. 9.00
Iridium—(Metallic), per oz. 7.00
Lanthanum—(Metallic), per gr. 10.00
Lithium—(Metallic), per gram. 10.00
Magnesium—Per lb. 4.50
Manganese—(Metallic), per lb. 1.10
Chem. pure, per oz. 10.00
Molybdenum—(Metallic), per gm .50
Niobium—(Metallic), ger gram. 5.00
Osmium—(Metallic), per oz. 65.00
Palladium—(Metallic), per oz. 35.00
Platinum—(Metallic), per oz. 16.50@20.00
Potassium—(Metallic), per lb. 28.00
Rhodium—(Metallic), per gram. 5.00
Ruthenium—(Metallic), per gm. 5.50
Rubidium—(Metallic), per gram. 2.00
Selenium—(Metallic), per oz. 1.80
Sodium—(Metallic), per lb. 2.50
Strontium—(Metallic), per gm. .60
Tantalum—(Metallic), per gram. 9.00
Telurium—(Metallic), per lb. 5.00
Thallium—(Metallic), per gram. .25
Titanium—(Metallic), per gram. 2.2
Thorium—(Metallic), per gram. 17.00
Tungsten—(Metallic), per lb. 1.00
Uranium—(Oxide), per lb. 5.00
Metallic, per gm. .20
Vanadium—(Metallic), per gm. 22.00
Yttrium—(Metallic), per gram. 9.00
Zirconium—(Metallic), per oz. 65.00

BUILDING MATERIAL.

Bricks—Fronts, nominal, ℔ 1,000.
Croton 14.00@.....
Wilmington 20.00@21.00
Philadelphia @22.00
Trenton @22.00
Baltimore @35.00
Building Stone—Amherst freestone, ℔ cu. ft. 95@1.00
Brownstone, ℔ cu. ft. 1.00@1.35
Granite, rough, ℔ cu. ft. 45@1.25
Granite, Scotch, ℔ cu. ft. 1.00@1.15
Cement—Rosendale, ℔ bbl. 85@1.10
Portland, American, ℔ bbl 2.25@2.45
Portland, foreign, ℔ bbl. 2.40@2.50
Portland, " special brands 2.60@2.85
Roman, ℔ bbl. 2.75@2.90
Keene's coarse, ℔ bbl. 4.50@5.50
Keene's fine, ℔ bbl. 7.25@8.50
Slate—Purple and green roofing, ℔ 100 ft. 7.00@7.50
Red roofing, ℔ 100 sq. ft. 12.00
Black roofing, ℔ 100 sq. ft. 4.25@5.50
Lime—St. John, com and finish., ℔ bbl. .90@.95
Glens Falls, com. and fin., ℔ bbl. 85@1.10